of the theory of Bouguer anomalies holds good on an even datum or at a constant height, only when the normal gravity anomaly, free air gravity anomaly and Bouguer anomaly are nearly parallel. The background levels are to be separated by an amount equivalent to free air correction factor between normal gravity and free air anomalies and by Bouguer correction factor between free air and Bouguer anomalies.

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DISCUSSION

OCCURRENCE OF UPPER OLIGOCENE-LOWER MIOCENE ROCKS IN THE UPPER CONTINENTAL SLOPE, OFF THE SOUTHERN PART OF CAUVERY BASIN by Gaitan Vaz and P. Vijaykumar. Jour. Geol. Soc. India, v.57, 2001, pp.141-147.

Yamuna Singh, Atomic Minerals Directorate for Exploration and Research, Begumpet, Hyderabad - 500 016 comments:

The authors may kindly clarify the following points:

Materials and Methods

1. The authors have stated that mineralogical constituents of the studied rocks were determined by X-ray diffractometry (XRD). However, radiation used for this purpose, along with instrumental parameters, has not been mentioned in the paper.
2. The authors have mentioned that they have collected greenish grey sediments for study, but the mineralogical constituents of these sediments have not been described anywhere in the paper.

Results

1. Sieve-like texture (Fig.3C) is stated to be due to the presence of clastic and micritic particles. What is the nature of clastic particles? Whether quartz and calcite form the clastic particles? If so, whether calcite is considered detrital?
2. It is not clear that how from X-ray diffractograms (Figs. 4 and 5) the authors have estimated abundances (given up to 1%) of different mineral constituents? These estimates are fraught with many inconsistencies.
3. Intensity (visual) of dolomite reflections in both the diffractograms (Figs.4 and 5) appears to be more or less equal. However, assuming that the visual intensity (even though it is not correct way) of various constituent minerals was a guiding factor in estimating their relative abundances, dolomite content is estimated to be 60% (for limestone) from Fig.4, as against 47% (for ferruginous envelope) from that of Fig.5. Also, intensity (visual) of calcite reflections in both the diffractograms (Figs.4 and 5) again looks to be nearly equal, but contrasting abundances of calcite have been estimated, i.e., ~10% from Fig.4 and 1% from Fig.5. Similarly, estimates of pyrite and goethite abundances also do not seem to have consistency with respect to their visual intensities.
4. Unlike other mineral reflections (Figs.4 and 5), why only one reflection of carbonate fluorapatite (CAF) has been marked in both the diffractograms? Whether other reflections of CAF are absent? Even though there is a noticeable variation in visual intensity of (only one marked) reflection of CAF (*see* Figs.4 and 5), the abundance of CAF is estimated to be equal in both the cases i.e., in the limestone (~8%) as well as in the ferruginous envelope (8%). The fact that CAF content is greater in ferruginous envelope is also clearly indicated by its higher content of P_2O_5 (8.70%) (*see* Table 1) than in limestone (5.40%).
5. Chemical composition of limestone and ferruginous envelope (Table 1) vis-a-vis their mineralogy does not seem to have been properly evaluated. Is there any influence of the observed fossil assemblage on the mineralogy and geochemistry of the host limestone and its envelope?

G. Gaitan Vaz, Geological Survey of India, Marine Wing, Kirlampudi Layout, Visakhapatnam - 530 017 replies:

The authors thank Yamuna Singh profusely for his keen observations and comments on this paper. Our paper is mainly focussed on the finding of exposures of ferruginous limestone in the upper continental slope off the southern part of Cauvery basin, fixing of its age by micro-palaeontological (i.e. foraminiferal and coralline algal) studies and on the northeasterly extension of a sedimentary basin. As the mineralogy and chemical constituents of limestone and ferruginous envelope are not very relevant to the main theme, they are discussed only briefly.

The following clarifications are hereby offered on the comments of Yamuna Singh:

Material and Methods

1. The powdered samples of ferruginous envelope and limestone were scanned using Philips X-ray diffractometer from 2° to 80° at 2θ/min with CuKα radiation.
2. Authors reiterate that the main emphasis of this paper is on the finding of Upper Oligocene-Lower Miocene exposure and its age through micro-palaeontological studies. The greenish clayey sediments occupying the sea floor in the vicinity are Recent sediments and not comparable with the age of rock exposures under reference. Hence, the mineralogy and chemistry of these Recent sediments are not given.

Results

1. It is mentioned in page 142, para 3 that "ferruginous limestone contains full and comminuted fossils mainly dominated by foraminifera, algae and echinoid spines". The unidentifiable foraminiferal debris are calcitic. These particles and quartz grains form the detrital constituents of limestone.
2. Various mineralogical constituents of limestone and ferruginous envelope have been identified from X-ray diffractogram, in accordance with the Mineral Powder Diffraction File Data Book by International Centre for Diffraction Data. As stated by Yamuna Singh, the percentage of individual minerals was determined by their peak intensity with consideration for the area of individual mineral peaks.
3. The visual intensity and area of dolomite peak in Fig.4 and Fig.5 are not equal. Total number of dolomite peaks are greater in Fig.4 (limestone) than Fig.5 (ferruginous envelope). Hence, a difference of 13% in dolomite content could be estimated. Certainly, the peak areas of calcite and pyrite vary from Fig.4 to Fig.5 and hence, the difference in percentage. Similarly, high percentage of goethite (44%) in the ferruginous envelope (Fig.5) is due to the greater number of significant peaks, intensity and area of goethite peaks, in comparison to limestone (Fig.4).
4. X-ray scan was carried out from 2° to 80° at 2θ/min. It was not possible to reproduce the full length of X-ray diffractogram in the paper. Therefore, only the relevant portion could be shown in Figs. 4 and 5. CFA peaks are observed at 40.80 and 63.70 at 2θ. The area of CFA peak shown in Fig.5 is slightly bigger than the CFA peak of Fig.4, which is considered insignificant. Hence, it reveals only a little difference of CFA between limestone (~8%) and ferruginous envelope (8%). P_2O_5 cannot be totally accounted for by carbonate fluor-apatite (CFA) only. The authors are of the opinion that in all probability, a certain amount of P_2O_5 occurs in the form of amorphous ferric phosphate (vivianite), but it is not diffracted in the sample of ferruginous envelope.
5. As far as the mineralogy vis-a-vis chemical composition of limestone and ferruginous envelope is concerned, the evaluation is properly made e.g., the CaO (35.27%) and MgO (7.29%) contents in limestone are comparable with the estimated dolomite content (60%). Similarly, CaO (23.99%) and MgO (4.11%) contents in ferruginous envelope are also very much comparable to the estimated value (47%). As such, there is no discrepancy in evaluation of mineralogy vis-a-vis chemical composition. The authors do not envisage any influence of the fossil assemblage on the mineralogy and chemistry of the limestone or ferruginous envelope.