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CRUSTAL STRUCTURE FROM GRAVITY AND MAGNETIC ANOMALIES IN THE CENTRAL PART OF THE K-G BASIN, INDIA

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ABSTRACT

The gravity and magnetic data along three profiles across the central part of the K-G basin of India have been collected and the data is interpreted for crustal structure depths. The first profile is taken from Bhogapuram to Kottakolidihi covering a distance of 100 km and the second starts from Bommuluruand ends at Chinnakarmeda covering a distance of 90 km and the third is from Tadikondato Chinakolla covering a distance of 95 km. The gravity lows and highs have clearly indicated various sub-basins and ridges. The density logs from ONGC, Chennai, show that the density contrast decreases with depth in the sedimentary basin, and hence, the gravity profiles are interpreted using variable density contrast with depth. From the Bouguer gravity anomaly, the residual anomaly is constructed by graphical method correlating with well data, subsurface geology and seismic information. The residual anomaly profiles are interpreted using polygon model. The maximum depths to the Khondalitic basement are obtained as 7.29 km, 5.76 km and 3.65 km for the first, second and third profiles respectively. The regional anomaly is interpreted as Moho rise towards coast. The aeromagnetic anomaly profiles are also interpreted for charnockite basement below the Khondalitic group of rocks using prismatic models.

KEYWORDS: Charnockite Basement, Gravity, Khondalite Basement, Variable Density Contrast, Magnetic. K-G Basin

INTRODUCTION

The Krishna-Godavari basin is located between 15°30'N - 17°N latitudes and 80°00'E - 82°30'E longitudes and covers 15,000 sq.km on land and about 25,000 sq. km on adjoining offshore regions on the east coast of India. It is an important and promising petroliferous basin of India. Tectonically, it is a pericratonic basin and it occurs on the margin of the Indian plate which is of highly metamorphosed Precambrian rocks consisting of mainly Khondalites. The sedimentary strata consists of clay, sandstone, limestone, and shale etc., deposited in marine as well as continental environment ranging in age from the Permian to Pliocene (Rao, 2001 and Sastri et al, 1981). RamamohanRao et al (1994) have studied the tectonic features of the basin and presented a basement configuration map of Chintalpudi and K-G basins.

O.N.G.C has carried out gravity and magnetic surveys in the K-G basin in 1960s (Kumar, 1993) and presented the Bouguer gravity anomaly map .Venkateswarulu (1971) has carried out gravity surveys over a part of the K-G basin and presented the Bouguer anomaly map and features. Radhakrishna Murthy and BangaruBabu(2006) have carried out regional magnetic surveys over a part of the K.G basin. Verma (1991) has analyzed few gravity profiles in the K-G basin. The geological and geophysical work clearly delineated the presence of a number of ridges and sub-basins trending in NE-SW directions (Prabhakar and Zutshi, 1993 and Hardas, 1991), viz; Gudivada sub-basin, Mandapeta sub-basin, Narasapur sub-basin, Krishna sub-basin, Nizampatanam sub-basin and Bapatla ridge, Yanam ridge, Tanuku ridge and Kaza ridge. The gravity and magnetic surveys are carried out on the entire K-G basin along nine profiles, at closely spaced interval, and placing the profiles at approximately 30 km interval and perpendicular to various tectonic features. In this paper three gravity and magnetic anomaly profiles arepresented along the lines shown in the tectonic map of Prabhakar and Zutshi (1993)(Figure 1). The gravity anomalies are interpreted with variable density contrast forKhondalitic basement depths and the aeromagnetic profiles are interpreted for the chornockite basement below the Khondalite group of rocks.

Gravity and Magnetic Surveys

The gravity, magnetic and DGPS(Differential Global Position System) observations are made along three profiles across the various tectonic features (Prabhakar and Zutshi, 1993)in the central part of the K-G basin as shown in Figure 1. Gravity measurements have been made at approximately 1.5 to 2km station interval. Gravity readings are taken with Lacoste-Romberg gravimeter and Position locations and elevations are determined by DGPS(Trimble). The HIG (Haiwaii Institute of Geophysics) gravity base station located in the Ist class waiting hall of Rajahmundry railway station is taken as the base station. The latitude and longitude of this base are 16°59'08.11818"N and 81°46'59.3941"E respectively. The gravity value at this base station is 978475.90 mgals. With reference to the above station, auxiliary bases are established for the day to day surveys. The Bouguer anomaly for these profiles is obtained after proper corrections viz (i) drift (ii) free air (iii) Bouguer and (iv) normal. The Bouguer density is taken a value of 2.0gm/cc after carrying out density measurements of the surface rocks. The gravity observations are made along available roads falling nearly on straight lines as shown in Figure 1. The maximum deviations from the straight lines at some places are around 5 km.

Total field magnetic anomalies are also observed at the same stations using Proton Precession Magnetometer but the data is later found to be erroneous. In order to get magnetic picture, aeromagnetic anomaly maps in toposheets 65G, 65H, 65L, 56P, 65D, 66A, and 66E covering the entire K-G basin on land from GSI are procured and anomaly data is taken along these three profiles. The total field magnetic anomalies are observed at an elevation of 1.5 km above msl. IGRF corrections are made for this data using standard computer programs and the reduced data is used for interpreting magnetic basement.

Variation of Density Contrast with Depth

The density data with depth from 16 wells in the K-G basin drilled by ONGC have been collected. The Khondalite basement is assumed to be having an average density of 2.7gm/cc. This value is subtracted from the well densities to obtain the density contrast with depth in the basin. After plotting these values against depth, a mean curve representing the variation of density contrast with depth has been drawn and shown in Figure 2. The well log density is available up to a depth of 4.5km. However, the curve is extended up to a depth of 6.5km as the maximum depthsdeduced from the gravity anomalies are around this value. The density contrast is about –0.67gm/cc at the surface and falls to –0.21gm/cc at 4.5 km depth. The decrease of density contrast is due to compaction, age etc. of the sedimentary strata. Hence, the interpretation of the gravity anomalies cannot be carried out with the assumption of a constant density contrast. The variation of density contrast with depth is approximated to a quadratic function (BhaskaraRao, 1986) such as $\Delta\rho\,(z) = a_0+a_1z+a_2z^2$, where$a_0$, a_1, a_2 are the constants to be found. Accordingly, the variation of density contrast is fitted to a quadratic function and the coefficients are solved by the least squares method. The values of the coefficients so obtained for a_0,a_1,a_2 are -0.67374, 0.18321 and -0.0166 respectively.

Interpretation

The gravity profiles are interpreted with quadratic density function by methods described by BhaskaraRao and

Radhakrishna Murthy (1986) using polygon model and BhaskaraRao (1986) using prism model. The results obtained by both the methods are nearly the same and hence the depths with prism model are not plotted. The aeromagnetic anomalies are interpreted for charnockite basement below the Khondalite group of rocks assuming prism models. The computer program TMAG2DIN is taken from Radhakrishna Murthy (1998) for interpretation of magnetic anomalies.

Gravity Profile along DD'

The profile (DD') runs from Bhogapuram (Latitude 16°43'46.08383"N and Longitude 80°59'41.12889"E) to Kottakolidihi (Latitude 16°30'30.97261"N and Longitude 81°27'470.88936"E) covering a distance of 100 km and 51 stations are established along this profile (Figure 4). The data is collected for three days from 28/12/2007 to 30/12/2007. This profile passes across the Bapatla ridge, Gudivada sub-basin, Kaza ridge and Naraspur sub-basin (Figure 1). The minimum and maximum Bouguer gravity anomalies over the basins and ridges are given in Table 1. The profile is passing through five ONGC wells of which three wells did not reach the Khondalitic basement and are drilled upto depths of, viz; 2411.03 meters (KK-15), 2626.11 meters (KK-14), 3010.60 meters (B-5) and are plotted as continuous lines in Figure 4 and the remaining two wells reached Khondalitic basement and are plotted as dotted lines in Figure 4. These two wells are drilled upto a depth of 2910.00 meters (B-4) and 3010.60 meters (LK-1) and are plotted as dotted lines in Figure 4. The basement depths based on sub-surface geology (Prabhakar and Zutshi, 1993), shown in Figure 3, are plotted as dotted curve and basement depths, based on seismic reflection surveys by ONGC (unpublished map), are plotted as continuous curve in Figure 4. Based on this data and by trial and error method of modeling, a smooth regional curve is drawn such that the interpretation of the resulting residual anomalies with quadratic density function gives rise to the depths conforming to the depths given by wells, seismic and subsurface geology. The regional is 0 mgals at the origin and continuously increases reaching a maximum of 52 mgals at 100 km distance from the land border of the basin and is shown in Figure 4. The regional is subtracted from the Bouguer anomaly and the residual is plotted as shown in Figure 4. The minimum and maximum residual anomalies on the basins and ridges are given in Table 1. The residual anomaly is interpreted with quadratic density function using polygon model and also with prismatic model. The depths are obtained by iterative method using Bott's method and the results at 10^{th} iteration are plotted as polygon in Figure 4. The errors between the residual and calculated anomalies are below $\pm$0.5 mgals. The maximum and minimum depths obtained over the basins and ridges are shown in Table 1. The interpreted depths are nearly coinciding with seismic and drilled depths. However, the depth obtained by the gravity method is as high as 7.4 km where the depth obtained by seismic method is 4.8 km. The regional anomaly is interpreted for Moho depths. For this, the normal Moho value outside the basin is taken as 42 km from Kaila et al (1990) and the regional anomaly is obtained by removing a constant value of 0 mgals from the regional and a density contrast of +0.6 gm/cc is assumed between the upper mantle and crust. The depths to Moho are deduced from the regional anomaly by Bott's method and the disposition of Moho is plotted at the bottom of Figure 4 and the Moho is identified at 32.5 km depth near the coast to 42 km on land border of the basin in NW.

Magnetic Profile along DD'

The magnetic data for the profile DD' is taken from two topo sheets (65H&65L and 56P& 65D) and the survey was conducted in the years 1985-1987. To construct the profile, IGRF corrections are made to this data using 1990 coefficients and the magnetic anomaly profile is constructed. The observed stations are placed on the topo sheets of the magnetic anomaly map and a mean straight line is drawn. The points of intersection of the magnetic contours with the straight line are noted and these values are plotted against the distance. The length of the magnetic anomaly profile is 100 km and is sampled at 5 km interval. The magnetic anomalies vary from -68 ηT to 154 ηT (Figure 5). The anomalies are interpreted for magnetic basement structure below Khondalites using prism models. The profile is interpreted by taking the mean depth of the basement at 8.0 km and constraining the depths to upper and lower limits of the basement as 2.0 km and 13.0 km respectively. The FORTRAN computer program TMAG2DIN to interpret the magnetic anomaly profile for basement interfaces is taken from Radhakrishna Murthy (1998).The program is based on the Marquadt algorithm and this seeks the minimum of the objective function defined by the sum of the squares of the differences between the observed and calculated anomalies. A linear order regional, viz; Ax+B, is assumed along this profile and the coefficients A and B are estimated by the computer. The profile is interpreted for different magnetization angles (Φ) and intensity of magnetizations (J). The average values for the total field (F), inclination (i) and declination (d) along this profile and the measured angle between the strike and magnetic north (α) are given in Table 2. Based on this data ,the magnetization angle Φ is calculated to be 30.13°. But by trial and error, the values for the best fit of the anomalies for Φ and J are given in Table 2. The values of the objective function, lamda (ג), regional at the origin (A), regional gradient (B) and the no.of iterations executed for normal as well as reverse magnetizations are also tabulated in Table 2. Here the objective function for normal magnetization is 0.04 and that for reverse magnetization is 2.21. For the reverse magnetization, the linear order regional is as shown in Figure 5. The residual anomaly after removing the regional from the observed anomaly is plotted in the figure. The differences between the residual and the calculated anomalies are negligible as shown in the figure. The interpretations of the depths for normal and reverse magnetizations for charnockite basement are shown in Figure 5. The depths for these two interpretations are not much different. The magnetic basement for reverse magnetization is presented in Figure 4. There is no correlation between the gravity and magnetic basements. The existence of charnockite basement below the Khondalitic group of rocks was also noted by Narayaswamy (1975) and Radhakrishna Murthy and BangaruBabu (2006). As the average susceptibility of the Khondalites is of the order of $10*10^{-6}$cgs units and that of charnockite is $2000*10^{-6}$cgs units, the Khondalitic basement cannot explain the observed magnetic anomalies. The modeling results place the charnockite basement at depths 2 to 7 km below the Khondalitic basement along this profile.

Gravity Profile along EE'

The profile EE' is taken from Bommuluru (Latitude 17°07'35.41818"N and Longitude 81°16'25.1941"E) to Chinnakarmeda (Latitude 16°39'34.85270"N and Longitude 81°57'29.1347"E) covering a distance of 90 km and 43 stations are established along this profile (Figure 6). The data is collected for two days from 2/4/2008 to 3/4/2008. This profile passes across the Krishna sub-basin, Bapatla ridge, Gudivada sub-basin, Kaza ridge and Narasapur sub-basin (Figire 1). The minimum and maximum Bouguer gravity anomalies over the basins and ridges are given in Table 1. The profile is passing through one ONGC well which reached Khondalitic basement (KZ-3) at a depth of 2861.00 meters and is plotted as dotted lines in Figure 6. The basement depths based on the sub-surface geology (Prabhakar and Zutshi, 1993) are plotted as dotted curve and basement depths based on seismic reflection survey by ONGC (unpublished map) are plotted as continuous curve. Based on this data and using gravity modeling, the regional is assumed as a smooth curve as shown in the figure. The regional is +25 mgals at the origin and continuously increases reaching a maximum of 62 mgals at 90 km distance from the land border of the K-G basin. The regional is subtracted from the Bouguer anomaly and the residual is plotted as shown in the figure. The minimum and maximum residual anomalies on the basins and ridges are given in Table 1.The residual anomaly is interpreted with quadratic density function using polygon and prism models. The depths are obtained by iterative method using Bott's method and the results at 10^{th} iteration are plotted as the polygon (Figure 6). The errors between the residual and calculated anomalies are below $\pm$0.5 mgals. The maximum and minimum depths over the basins and ridges are given in Table 1. The interpreted depths are nearly coinciding with seismic and drilled depths. However, the depth obtained at one place by the gravity methods is slightly greater than that obtained by seismic method. The regional anomaly is interpreted for Moho depths. For this, a constant value of +25 m gals is subtracted from the regional. The Moho is plotted at the bottom of Figure 6 and it shows that Moho rises to 33 km towards SE near the coast.

Magnetic Profile along EE'

The magnetic data for the profile EE' is taken from two topo sheets (56P& 65D, and 66A). The survey was conducted in the years 1985-1987 .IGRF corrections are made to this data using 1990 coefficients, and the magnetic anomaly profile is constructed. The length of the magnetic anomaly profile is 90 km and is sampled at 5 km interval. The magnetic anomalies vary from -44 ηT to 110 ηT along this profile (Figure 7). The anomalies are interpreted for magnetic basement below Khondalites using prism models. After several trials, the profile is interpreted by taking the mean depth of the basement at 7.5 km and constraining the depths to upper and lower limits of the basement as 2.0 km and 11.0 km respectively. A linear order regional, viz; Ax+B, is assumed along this profile and the coefficients A and B are estimated by the computer. The profile is interpreted for different magnetizations angles (Φ) and intensity of magnetizations (J). The results of interpretation of the magnetic profile EE' are given in Table 2. The interpretations of the depths for normal and reverse magnetizations are shown in Figure 7. These two are nearly the same. The magnetic basement for reverse magnetization is presented in Figure 6. There is no correlation between the Khondalitic and charnockitic basements obtained by the gravity and magnetic methods respectively. Here the objective function for normal magnetization is 0.58 and that for reverse magnetization is 1.22. For the reverse magnetizations, the linear order regional is as shown in the figure. The residual anomaly after removing the regional from the observed anomaly is plotted in the figure. The differences between the residual and the calculated anomalies are negligible as shown in the figure. The charnockite basement depths for the reverse magnetizations are from 1 to 10km below the Khondalitic basement along this profile.

Gravity Profile along FF'

The profile FF' is taken from Tadikonda (Latitude 17°00'11.20361"N and Longitude 81°07'25.1256"E) to Chinakolla (Latitude 16°30'14.3520"N and Longitude 81°45'01.1323"E) covering a distance of 95 km and 48 stations are established along this profile (Figure 8). The data is collected for two days from 5/4/2008 to 6/4/2008.This profile passes across the Krishna sub-basin, Bapatla ridge and Nizamapatanam sub-basin. The minimum and maximum Bouguer gravity anomalies over the basins and ridges are given in Table 1. The basement depths, based on sub-surface geology (Prabhakar and Zutshi, 1993), are plotted as dotted curve and basement depths, based on seismic reflection surveys by ONGC (unpublished map), are plotted as continuous curve. Based on this data and using gravity modeling, the regional is assumed as a smooth curve as shown in the figure. The regional is -6 mgals at the origin and continuously increases reaching a maximum of 65 mgals towards SE near the coast. The minimum and maximum residual anomalies on the basins and ridges are given in Table 1. The residual anomaly is interpreted with quadratic density function using polygon and prism models. The depths are obtained by iterative method using Bott's method and the results at 10^{th} iteration are plotted as polygon (Figure 8). The maximum and minimum depths over the basins and ridges are given in Table 1. The interpreted depths are nearly coinciding with seismic and subsurface geological depths. The regional anomaly is interpreted for Moho depths. For this, the regional anomaly is obtained by removing a constant value of -6 mgals from the regional. The Moho depths are plotted at the bottom. It is observed that the Moho depths are decreasing towards the coast.

Magnetic Profile along FF'

The magnetic data for the profile FF' is taken from two topo sheets (56P &65D, and 65A). The survey was conducted in the years 1985-1987. IGRF corrections are made to this data using 1985 and 1990 coefficients and the magnetic anomaly profile is constructed. The length of the magnetic anomaly profile is 90 km and is sampled at 5 km interval. The magnetic anomalies vary from -80ηT to 156 ηT. The anomalies are interpreted for magnetic basement structure below Khondalites using prism models. The profile is interpreted by taking the mean depth of the basement at 7.5 km and constraining the depths to upper and lower limits of the basement as 2.0 km and 9.5 km respectively. A linear order regional is assumed along this profile. The profile is interpreted for different magnetizations angles (Φ) and intensity of magnetizations (J). The results of interpretation of the magnetic profile FF' for normal and reverse magnetizations are given in Table 2. The interpretation of the depths for these magnetizations are shown in Figure 9. These two interpretations are nearly the same. There is no correlation between the basements obtained by the gravity and magnetic methods. Here the objective function for normal magnetization is 301.26 and that for reverse magnetization is 17.57. The observed and the best fitting anomalies for reverse magnetization are also shown in Figure 3.19. For the reverse magnetizations, the linear order regional is as shown in the figure. The residual anomaly after removing the regional from the observed anomaly is plotted in the figure. The differences between the residual and the calculated anomalies are negligible as shown in the figure. The magnetic basement for reverse magnetization is presented in Figure 8. The charnockite basement depths for the reverse magnetizations are from 0 to 9.5 km below the Khondalitic basement along this profile, and show more oscillations.

RESULTS AND DISCUSSIONS

The gravity and magnetic surveys have been carried out along three profiles laid perpendicular to various tectonic features, approximately at 30 km interval, in the central part of the K-G basin. The subsurface geology, depths obtained from seismic reflection surveys and information available from the boreholes along these profiles are used to estimate the regional in the case of gravity anomalies. The residual gravity anomalies are interpreted for the thickness of the sediments in the basins and on ridges using variable density contrast. The density data obtained from various boreholes drilled in connection with oil and natural gas exploration is used to estimate variable density contrast, which is approximated by a quadratic function. The gravity anomalies are interpreted with polygon model (BhaskaraRao and Radhakrishna Murthy 1986) and depths are plotted. The anomalies are also interpreted with prism model (BhaskaraRao, 1986), and as the depths are nearly the same for both the methods, these are not shown in the figure. The basement for the sedimentary fill is the Khondalitic group of rocks. The depth obtained by gravity methods on the Bapatla ridge, Gudivada sub-basin,Kaza ridge and Narasapur sub-basin are 0.4 km, 7.30 km ,3.0 km and 4.30 km respectively along the profile DD'. These depths are nearly the same as those given by seismic and sub-surface geological studies except in the Gudivada sub-basin as the depths are much greater than the depths obtained by seismic methods. The may be due to poor penetration of seismic energy to deeper levels. Along the profile EE' the depths obtained on Krishna sub-basin kaza ridge and narasapur sub-basin are 5.8 km,2.10 km, 3.9 km, 2.50 km and 6.20 km respectively. These depths are nearly the same as those given by seismic and subsurface geological studies except in the Krishna sub basin. Along the profile FF', the depths obtained by gravity methods on the Krishna sub-basin Bapatla ridge and Nizamaptanam sub-basin are 3.70 km,2.20 km , 2.40 km respectively and these are nearly the same as those given by seismic and subsurface geological studies.The aeromagnetic anomalies 0 to 10 km below the khondalite basement. The regional anomaly is interpreted for Moho depths and it is rising towards the coast along these profiles. The Moho depth outside the basin is taken as 42 km and the Moho depths near the coast are obtained as 32.5 km, 33 km and 30 km for the profiles DD', EE' and FF' respectively. The gravity studies clearly brought out the structure of the sedimentary basin along these three profiles and supplement seismic and geological studies.

The aeromagnetic anomalies along these three profiles are also interpreted as a basement structure below the sediments. The magnetic basements do not coincide with the gravity basements. The depths obtained for chornackite basement for normal and reverse magnetization are nearly the same. The best fit for the observed magnetic anomalies is obtained for chornackite basement structure 0 to 10 km below the Khodalitic basement. The values of magnetization angle and intensity of magnetization show that the anomalies are caused by remanent magnetization. The existence of chornackite basement 2km below the Khondalitic basement was also noted by RadhakrishnaMurthy and BangaruBabu (2006) and NarayanaSwamy (1975). Though the upper limit for chornackite basement is set at 2 km, it never reached depths less than 6 km. As the susceptibility of the Khondalites is very low, it cannot explain the observed magnetic anomalies. The observed magnetic anomalies can be best explained with the intensity of magnetizations 250, 270, and 350 gammas for DD', EE' and FF' profiles respectively. The modeling results for various profiles place the chornackite basement at 0 to 10 km below the Khondalite basement.

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APPENDICES

Table 1: Anomalies in Mgals/Depths in Km on Various Tectonic Features

Profile	Type of Anomaly /Depths	Krishna Sub-Basin	Bapatla Ridge	Gudivada Sub-Basin	Kaza Ridge	Naraspur Sub-Basin	Nizamapatnam Sub-Basin
DD'	Bouguer(mgl)	--------	-7.0	-61.0	-35.0	-19.0	----
DD'	Residual(mgl)	-------	-10.0	-75.0	-60.0	-65.0	----
DD'	Depths(km)	-------	0.4	7.3	3.0	4.30	----
EE'	Bouguer(mgl)	-25.0	+5.0	-5.0	+2.0	-1.0	----
EE'	Residual(mgl)	-68.0	-47.0	-61.0	-57.0	-63.0	---
EE'	Depths(km)	5.80	2.10	3.90	2.50	6.20	----
FF'	Bouguer(mgl)	-40.0	+8.0	-----	----	----	+8.0
FF'	Residual(mgl)	-55.0	-35.0	-----	-----	-----	-52.0
FF'	Depths(km)	3.70	2.20	------	----	-----	2.40

Table 2: Results of Magnetic Interpretation

Pro File	Magne Tization	Average Value of Total Field(F)	Average Value of Inclin Ation (I)	Angle Between Strike And Magnetic North(A)	Calculated Magnetization Angle (Φ)	Assumed Magnetization Angle For Best Fit (Φ)	Assumed Value of Intensity of Magnetization For Best Fit (J) in Gammas	Regional at the Origin (A)	Regional Gradient(B)	Damping Factor (ג)	Iterations Carried Out	Objective Function
DD'	Normal	41900	18.97	39	30.13	+30.0	250	120.5	-1.5	0.00	2nd	0.04
DD'	Reverse	41900	18.97	39	30.13	-30.0	250	146.5	-1.9	0.00	3rd	2.21
EE'	Normal	41450	18.90	40	28.03	+30.0	270	82.8	-1.4	0.00	2nd	0.58
EE'	Reverse	41450	18.90	40	28.03	-30.0	270	71.0	-1.2	0.00	2nd	1.22
FF'	Normal	41000	17.97	38	27.78	+30.0	350	158.7	-2.4	0.00	50h	301.26
FF'	Reverse	41000	17.97	38	27.78	-30.0	350	150.0	-2.3	0.00	2nd	17.57

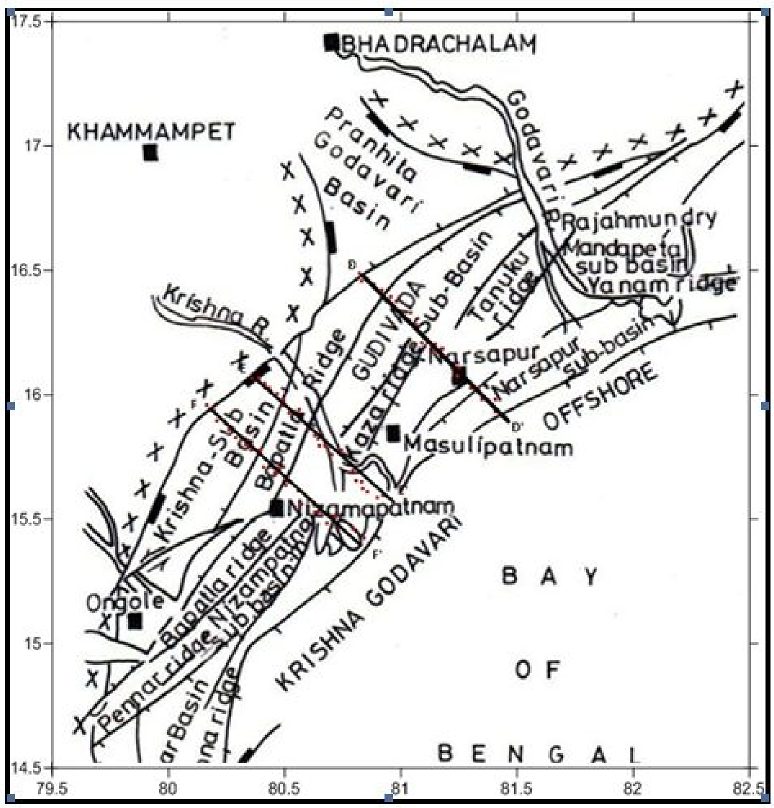

Figure 1: Tectonic Elements of Krishna-Godavari Basin (After Prabhakar and Zutshi, 1993)

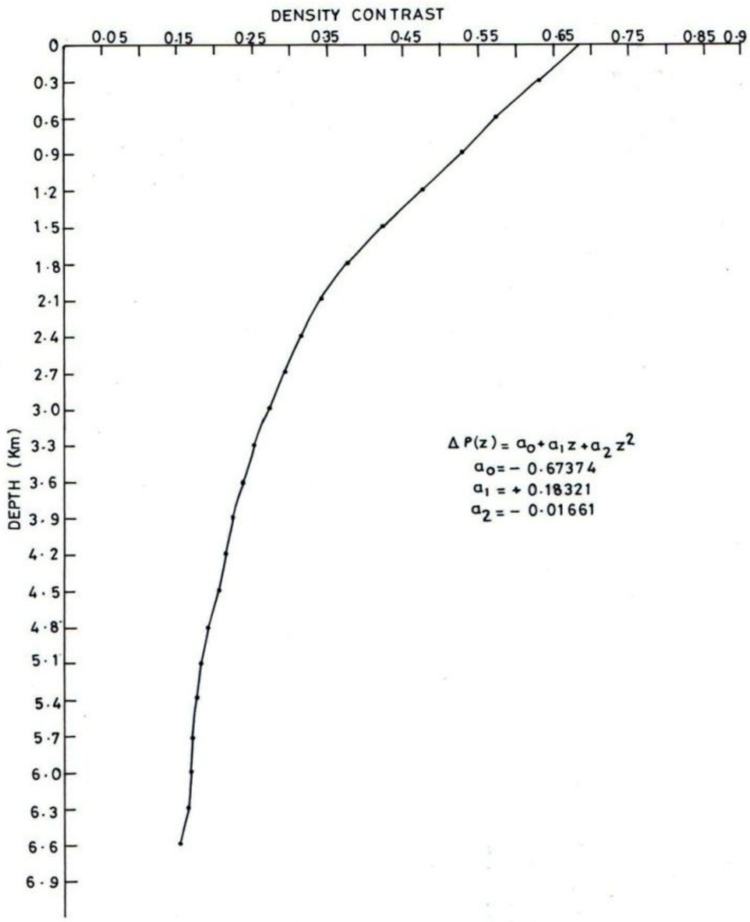

Figure 2: Variation of Density Contrast with Depth

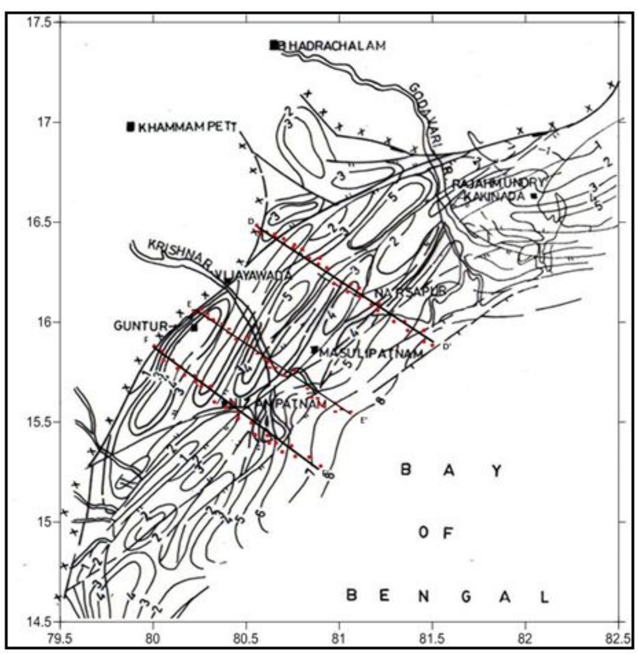

Figure 3: Basement Configuration Map of Krishna-Godavari Basin (Afterprabhakar and Zutshi, 1993)

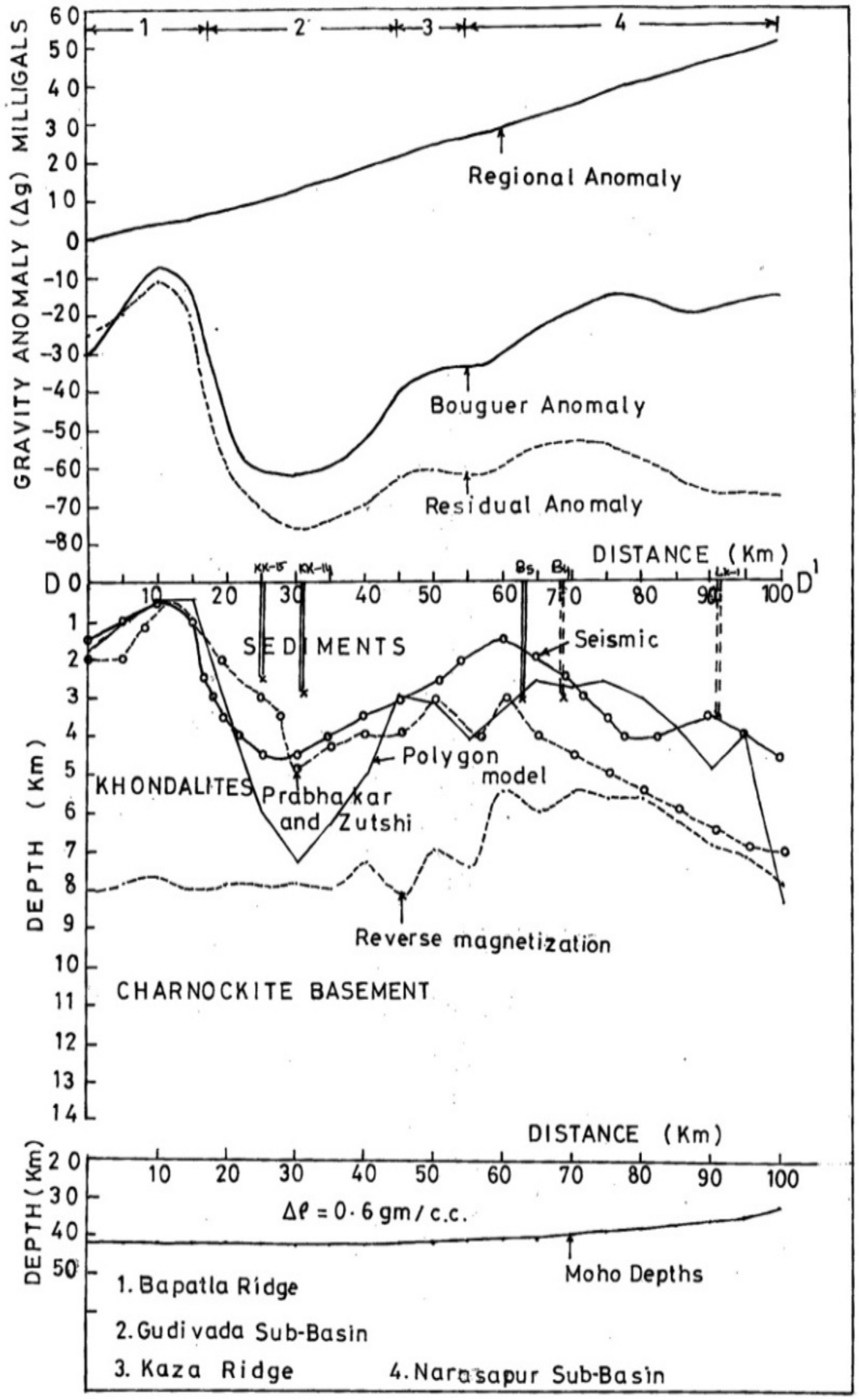

Figure 4: Interpretation of Gravity Anomaly Profile along DD'

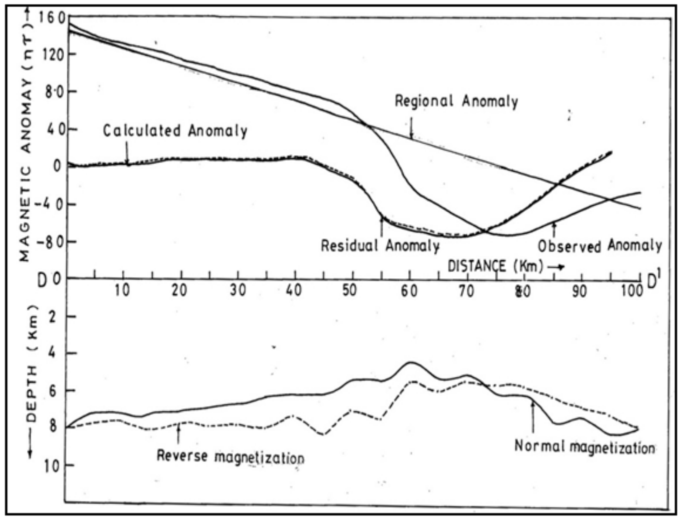

Figure 5: Interpretation of Total Field Magnetic Anomaly Profile along DD'

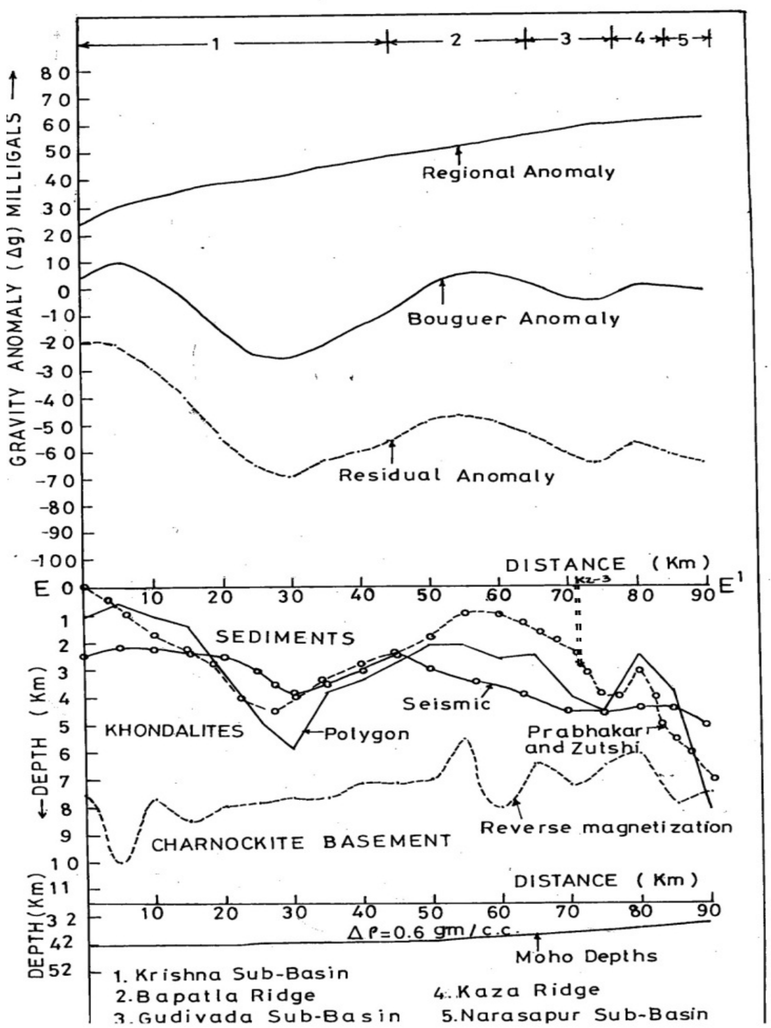

Figure 6: Interpretation of Gravity Anomaly Profile along EE'

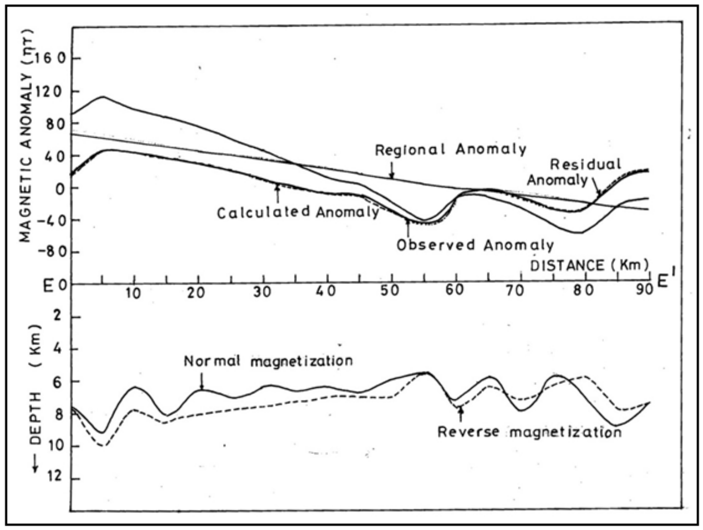

Figure 7: Interpretation of Total Field Magnetic Anomaly Profile along EE'

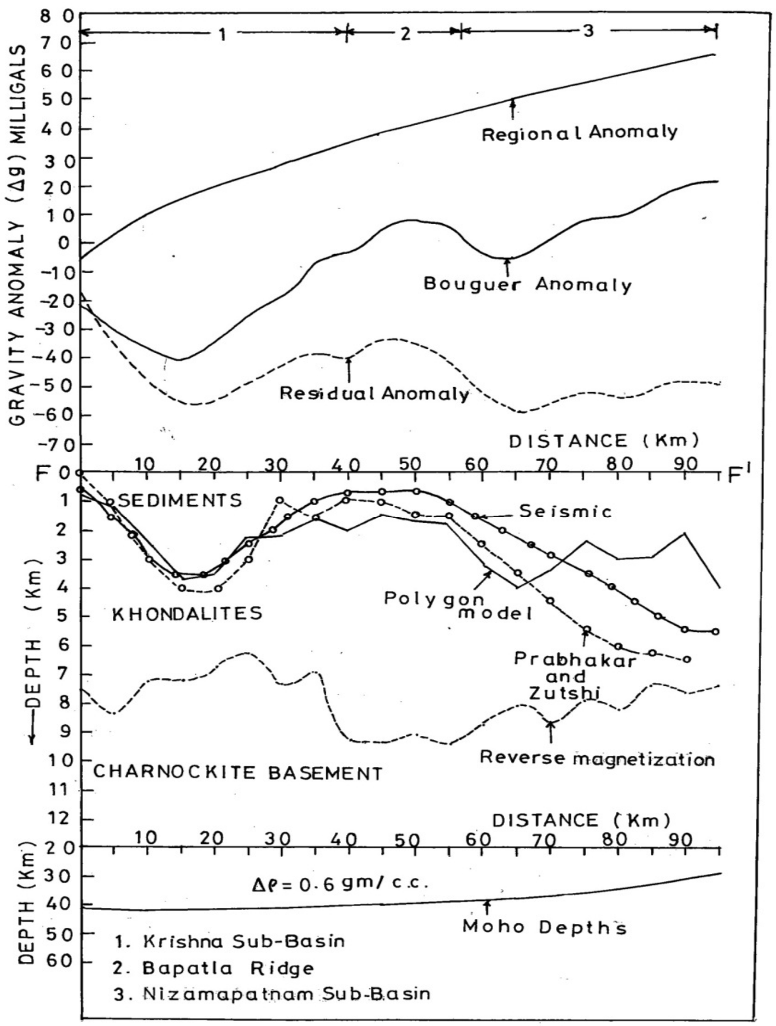

Figure 8: Interpretation of Gravity Anomaly Profile along FF'

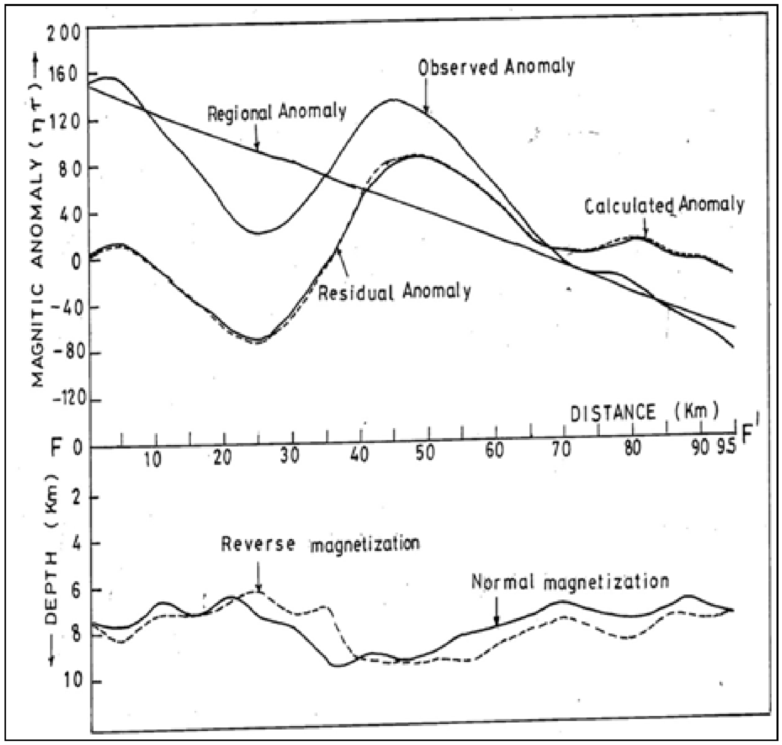

Figure 9: Interpretation of Total Field Magnetic Anomaly Profile along FF'