The Effect of Density Data in Gravity Interpretation at Endut Mountain in Jawa Barat Province, Indonesia*

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Search and Discovery Article #40906 (2012)
Posted April 9, 2012

*Adapted from extended abstract prepared in conjunction with poster presentation at AAPG Annual Convention and Exhibition, Long Beach, California, April 22-25, 2012 AAPG©2012

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Abstract

We have explored the effect of gravity density data at Endut Mountain area (Figure 1 and Figure 2) using conventional gravity method (Lowrie, 2007). The measurement showed the gravity density data varies to the position and elevation on the surface. The data are set to be 246, 128, and 64 data with respect to station interval 250 m, 500 m, and 1000 m, respectively. We have compared three density of data to show the trend of gravity anomaly. Analysis data revealed that the trend of low gravity anomaly are encountered at the northern part of the study area. Using detailed analysis of density data of all exhibits the low of gravity anomaly at the North-West and high anomaly at the South-West. The interpretation data from high density to low density also showed the same trend of gravity anomaly (Surfer Software Manual Book). This means that the low density data can be used to interpretation gravity anomaly if the coverage measurement is relatively distributed.

Introduction

Modern gravity exploration began during the first third of the twentieth century, was responsible for probably the first geophysical oil and gas discovery (LaFehr, 1980), and continues to this day as a small but important element in current exploration programs. Earlier reviews (LaFehr, 1980; Paterson and Reeves, 1985; Hansen, 2001) document the continuous evolution of instruments, field operations, data processing techniques, and methods of interpretation. They also comment on the state of the geophysical literature, “allowing mathematical sophistication to overshadow geologic utility” (LaFehr, 1980; Paterson and Reeves, 1985).

Gravity Survey is one of initial survey done in geophysics survey to find anomaly related to determining the location of reservoir. The survey done in Mt. Endut covers a wide area of measurement and collects large amount of data. The variation of amount of data is

done by editing the measured data, deleting several datas to see variation in contrast density, which shows the relation between amount of data and the contour map of density resulted.

Efectivity and efficiency is the key word to be discussed in obtaining the best data for the survey. Variation of gravity data amount in Gunung Endut Case Study shows correlation with the contour map, spacing of survey points, and the density trend obtained.

Method

Gravity data processing sequence apply are as followed (see Figure 3).

The data obatained from each point of the gridding of the gravity survey is 246 data. Variation of data is done by deleting half of the data and make the gridpoint spacing twice as its initial data, hence we got 128 data. The third variation is by deleting half of the data from the 128 data to 64 data thus the spacing become four times as its intital spacing.

So we got three variation of data: 246 data with 250 m spacing, 128 data with 500 m spacing, and 64 data with 1000 m spacing (see Figure 4).

Results and Discussion

The Bouguer Anomaly Map on Figure 5 shows significant difference of the width of the anomaly area, but still shows the same anomaly trend.

The Regional Anomaly Map on Figure 6 results in large interval difference. The smaller the amount of data, (larger spacing) shows less detail result in the figure. This affected the range of interval which also decreased.

Figure 7 shows the local anomaly distribution which indicates relatively same trend on all three variations. Althoung the range does not represent the real areas width, the trend clearly shows the anomaly area of low density is located in the northwest and the high density anomaly is located at southwest area.

These three variations of data exhibit more detail, of its effect in determining the area extent of the reservoir, that our survey was able to measure. But the amount of data does not directly affect the trend of the anomaly recorded. Therefore, the survey design and gridding which cover relatively smaller data measured and relevant spacing does not give significant effect to the trend of anomaly resulted.

Conclusions

Comparison of the three data variations show the anomaly obtained has realatively the same trend. The low density anomaly is located at the northwest area and the high anomaly area at the southwest

The last variation of data with 1000 m spacing does not show anomaly border details clearly, thus more dense spacing will delineate better the anomaly border.

Acknowledgement

We thank the following, Centre for Geological Resources, for gravity data.

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Lowrie, W., 2007, Fundamental of Geophysics, 2nd edition: Cambridge University Press, Cambridge, UK, 381 p.

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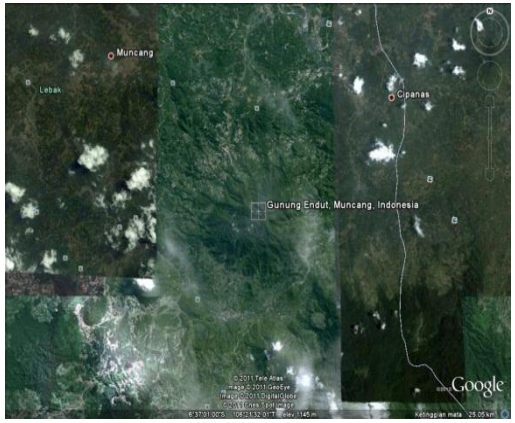

Figure 1. Mt. Endut via Satelite.

Figure 2. Point of measurment at Mt. Endut.

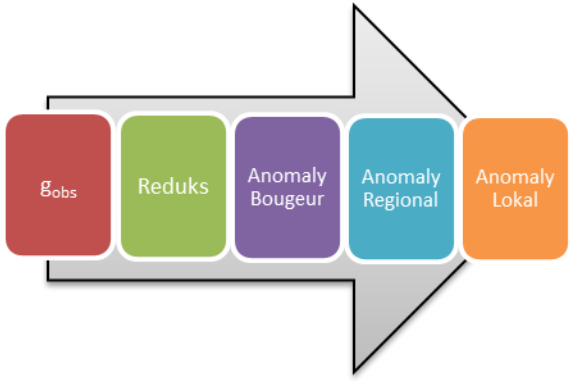

Figure 3. Flowchart Processing of Gravity Data.

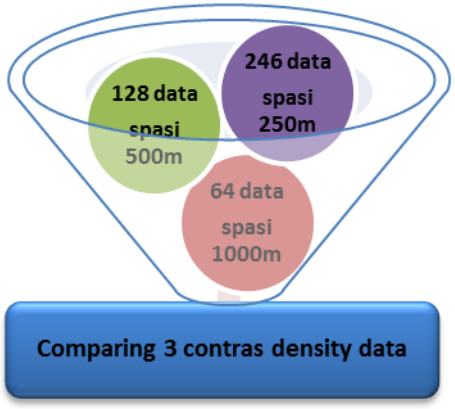

Figure 4. Comparison 3 contras density data from variation of gravity data.

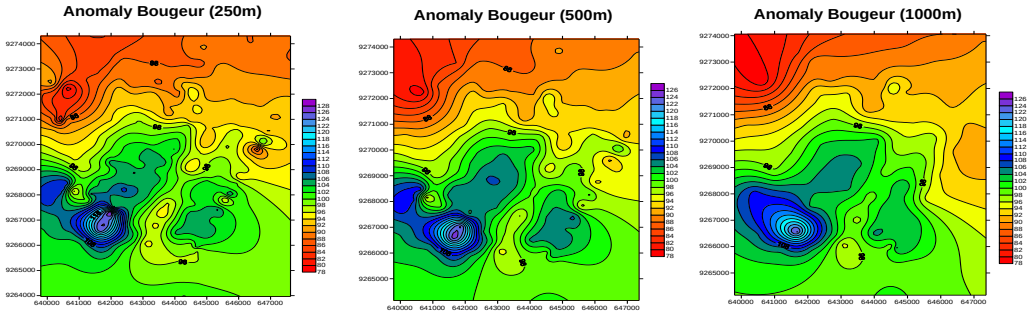

Figure 5. Anomaly Bouguer.

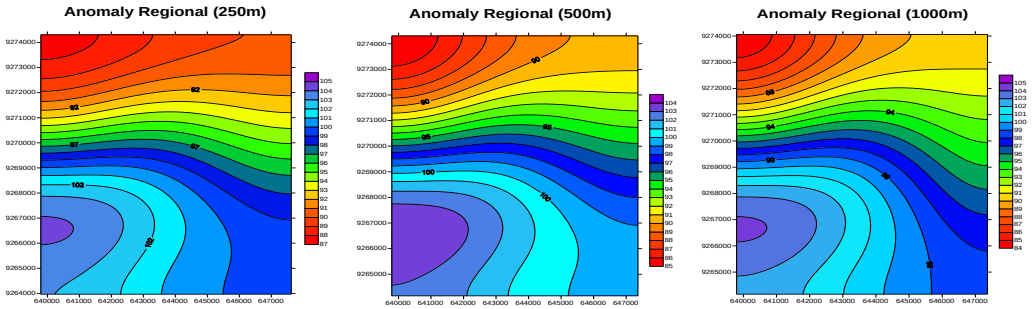

Figure 6. Anomaly Regional.

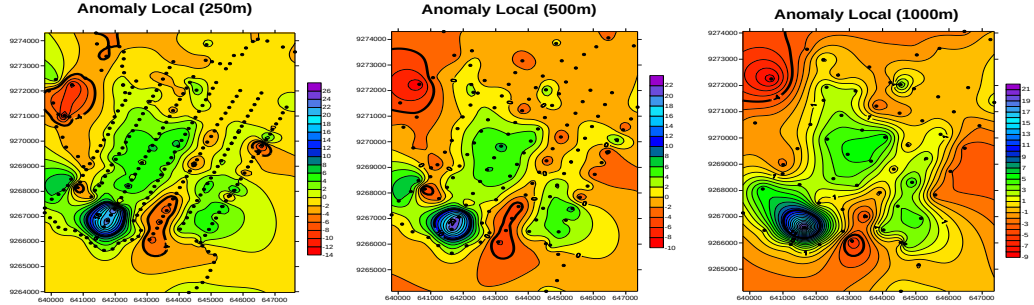

Figure 7. Anomaly Local.