P10-9 COMPUTER INTERPRETATION OF TWO-DIMENSIONAL GRAVITY AND MAGNETIC ANOMALIES

SENOL OZYALIN and ZAFER AKCIG
D.E.U. Muh. Fak. Jeofizik Muh. Bol. 35100 Izmir, Turkey
E-mail: sozyalin@izmir.eng.deu.edu.tr

As it is known, gravity and magnetic methods use earth's potential field. Because there are multi solutions to the data of these fields, endless number of models can be devised to give the same anomaly. In gravity and magnetic modeling, anomaly is essentially affected by three parameters. The first is the density or magnetic susceptibility of structure, the second is the shape of structure, and the third is the depth of structure. If values of density and magnetic susceptibility (as well as the earth's magnetic field) of the region are determined accurately, the resulting model can be achieved much better. I earlier years, modeling would be conducted by simulation to structures with simple geometrical shapes such sphere, cylinder etc. But, in real case, the fact that geological structures have more complicated shapes directed the business of modeling towards the modeling of multi-shaped structures. Being motivated by this, Talwani et al. (1959) formulated modeling to be carried out for the arbitrary shapes.

I can not be ignored that electronic and computer technologies, which showed very fast developments in the world, contributed to geophysics a great deal. Thanks to these above-mentioned contributions, various software programs were started to be used. In the scope of this paper, a two dimensional modeling program "SENTAL" was devised by using windows'98 database.

I can not be understated that technological developments contributed a great deal visual programming. For this purpose, many features provided by windows'98 were included in this program. For example, availability of menu bars and shortcut icons, also existence of worksheet facility helps increase the usability of this program.

There are two main features in this program. The first feature is the one that it provides opportunity to work on the map base. In this part, a two dimensional anomaly map can be illustrated with equally spaced digital form. This illustrated data can be plotted with a desired contour intervals. Profile can be achieved from this data as well for modeling along every desired direction. This procedure is carried out with mouse for the determination of the start and the end points of the profile. There is no need two considers the coordinates of the start and the end points of the profile. The second feature is that it provides the users the opportunity to work directly on the profile base. It is enough to enter the data once during the process of modeling. The fact that both the anomaly curve and the possible geological model are on the same plane provides visual conveniences.

As it is known, corner coordinates of the data should be changed at every phase of interpretation during modeling in the DOS environment. One of the features that increases the usability of SENTAL program is that the place of the corner coordinates could be changed without entering new data. This transaction can be done by only one movement of the mouse button. This transaction is carried out by clicking the corner point to be carried and letting the mouse button again after being carried to its new place. Then the new corner points would have been included in the calculation, and by letting the mouse free button, both the anomaly of the new model and the calculated anomaly can be seen on the screen. For entering the coordinates of the new corner points, there is no need to leave the current program. Entering a new point of corner can be realised by going to desired place on the screen and clicking the mouse button. Thus a new point of corner would be added to the data and this new data could be stored in the memory.

When, during the study, you want to add a new structure to the already existing ones, program will let you do it without interrupting its function. The same way again, if there is a structure to be deleted completely, that structure is determined and deleted completely by a delete order.

If one wants to shift the structure during his work, it is also to achieve this program To do this the block structure to be shifted is held with the mouse and dragged to its new place. Again there is no need for entering all the new values of the corner coordinates of the structure.

Also there is the zoom feature. By this feature, study model van be made small or enlarged by one to one or independently to desired size. The model can be activated on the screen from right to left or from bottom to top by one action.

In short, the fact that the program provides some flexible features of usage during programming contributes the users both in terms of time and great easiness for usage.

References

Talwani, M., Worzel, L., and Landisman, M.,1959, Rapid Gravity computation for two dimensional bodies with application to the Mendocino Submarine fracture zones, Jour. of Geophs.res.,64,45-59.