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A Method of Field Research Incorporating the Results of the Surveying by GSI and MLIT - Gravity Profiles as an Example -

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1. Introduction

To reduce the natural disasters such as earthquakes or landslides, it is essential to the studies of earth science involving field works. Thereupon, it is necessary to acquire geographic location information about these survey sites. In recent years, it has been progressing to publicize digitized geographic information from the Web site established by Geospatial Information Authority of Japan (GSI), Ministry of Land, Infrastructure, Transport and Tourism (MLIT) or many municipalities. As a result, it is possible to obtain positional data of the land (longitudes and latitudes) and elevations from the mean sea level of the reference point. These services, in many cases, can be utilized in academic research.

To make various corrections in gravity surveys, geographic information of latitude, longitude and altitude values are required on the measurement points. Therefore, in this study, the process of using those public digitized information of triangulation points and benchmarks is described to perform gravity survey.

2. Target area

Gravity measurement survey line of interest is about 5.8 Km leading from Sanjodori, Sakai-ku to Tono-cho, Kita-ku, Sakai City, Osaka. This line has been crossed in Uemachi Fault. At the center of the line, there is a growing gravity anomaly.

3. Acquisition of geographic information

Measurement of gravity was performed on the triangulation point or the benchmark. The latitude, longitude and elevation values were obtained from the numerical information provided on the above-mentioned web site is used. They can be relatively easily obtained but there is each site-specific use restrictions. The values obtained information of the point or the benchmark is used for illustration of the measurement point and correction of gravity value.

4. Result

Accuracy is good when used the results of the survey on the triangulation point or the benchmark, as compared with the case of digitizing to enter the latitude or longitude value and reading the elevation values from topographic maps (Ryoki (2011), Ryoki and Nishitani (2013), Ryoki (2014)). Then, the time, it takes for data aggregation work, can be greatly reduced. In particular, since the error of the elevation values becomes to be within the range defined by the grade of each reference point, the homogeneity of the data has been secured.

5. Conclusion

Marks of the metal, that are triangulation points or benchmarks of public survey to manage by municipalities and survey of the city district for urban regeneration by MLIT, are found relatively easily in site. It is also possible to measure gravity, etc. on that point. Thus, these usage has been found to be highly convenient in the field research. Through this study, use of triangulation point or benchmark has been shown to be effective to efficiency improvements and uniformity of accuracy in field research, such as earth science.

References

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Keywords: gravity structure, digital geographic information, Uemachi Fault, Mikunigaoka Subsuface Peak, high-density intrusive rock, efficiency of measurement