

Mesurement for vertical gravity gradient by CG-5 Autograv Gravimeter

*Masami Handa¹, Akira Tomiyama¹, Tokuro Kodama¹, Shinobu Kurihara¹, Kumikazu Ochi¹,
Shuichi Omori¹

1. GSI of Japan

The Geospatial Information Authority of Japan (GSI) has determined the vertical gravity gradient (hereafter, “VGG”) which is the spatial rate of vertical change of gravity by several times of manual measurements at two different heights using LaCoste & Romberg G-type relative gravimeter (hereafter, LaCoste gravimeter), in order to convert the gravity data at 1.2 m above the ground surface measured by FG5 absolute gravimeter. Due to the start of the airborne gravity survey, at several airports in Japan, the measurement of VGG in the several airports is required for the purpose of conversion from the gravity at the surface of ground to that at the height of the gravimeter mounted on an aircraft. For the improvement of the work efficiency in the measurement of VGG, we tried to introduce the Autograv CG5 relative gravimeter (hereafter, “CG5”) enabling automated measurement. The simultaneous measurement at the lower and upper heights above a gravity point with two CG-5s saves the time of the measurement, and a large amount of gravity data can be collected by the continuous measurement. On the other hand, occasionally CG-5 has unstableness such as nonlinear mechanical drift on measured data according to the change in the ambient temperature and mechanical incline. Then, we considered the method of the VGG measurement by CG-5 and verified the measured VGG comparing with that measured by LaCoste gravimeter.

As a result of the measurement at the Ishioka Geodetic Observing Station, the measured VGG by CG-5 and that by LaCoste gravimeter were 0.353 ± 0.004 mGal/m and 0.357 ± 0.009 mGal/m respectively. Since the difference between two measured VGG is smaller than the difference among individual LaCoste gravimeters of the VGG measurement in the past decade, the VGG measured by CG-5 is considered reliable.

In this presentation, the process of consideration of the VGG measurement method and the result of verification of its precision will be reported.

Keywords: Vertical gravity gradient, Relative gravimeter