

Implementation of Domestic Comparison of Absolute Gravimeters Ishioka Geodetic Observing station and construction of Japan Gravity Standardization Net 2016 (JGSN 2016)

*Chiaki Kato¹, Kenji Yoshida¹, Yoshifumi Hiraoka¹, Toshihiro Yahagi¹

1. GSI of Japan

Geospatial information authority of Japan (GSI) has held the Domestic Comparison of Absolute Gravimeters (DCAG) annually since 2002 with several domestic organizations which own absolute gravimeters. By comparing with the results of the FG5 absolute gravimeters, which is operated by the National Institute of Advanced Industrial Science and Technology (AIST) and routinely participate in International Comparison of Absolute Gravimeters supported by BIPM, we could expect to confirm the consistency of our equipment with international standard.

While DCAG had been held at a hotel located in Mt. Tsukuba area until 2015, it was done at GSI's new Ishioka Geodetic Observing Station (Ishioka city, hereinafter referred to as Ishioka station) in 2016. Since Ishioka station has a special room for DCAG as described later, it is expected that we can conduct DCAG much more precisely under better environment.

The gravity measurement facility of Ishioka station is very unique in several respects. It is firmly coupled to the support layer with a plurality of concrete piles and its base plate is isolated from the building in order to reduce the effect of ground vibration. It is designed to set up six absolute gravimeters simultaneously on each points which have precise coordinates decided by GNSS and leveling before the construction. Since Ishioka station also has the VLBI facility, we can utilize the distributed hydrogen maser's signal to minimize clock errors between absolute gravimeters. Of course, we can expect less artificial noise because of its suburban location. Thanks to those improvements, we successfully achieved good results in the latest DCAG within the range of instrumental error.

GSI has released a new Japan Gravity Standardization Network (JGSN) 2016 in March 2017 for the first time in 40 years. It was composed of both absolute and relative gravity measurement data carried out by GSI between 2002 and 2016. On the course of its measurements, we used our FG5 calibrated by DCAG to determine the absolute gravity values. DCAG obviously played a key role in making JGSN2016 highly reliable and consistent with the global gravity standards.

We will report the results of past DCAG and its contribution to the JGSN2016.

Keywords: Domestic comparison of Absolute Gravimeters, FG5 Absolute gravimeter, Japan Gravity Standardization Net 2016