

SGD002-P01

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## Introduction and performance of gPhone gravimeter

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TRIES has introduced a gPhone (#90) which was spring-type relative gravimeter developed by Microg LaCoste, Inc. in December 20, 2009. Though the sensor of gPhone is the same sensor as LaCoste&Romberg (L&R) G-type gravimeter, gPhone comprises it in a well-sealed container to reduce disturbance by ambient temperature and ambient pressure changes. Furthermore, GPS-disciplined Rb clock and UPS are included in the electronic unit of gPhone. The frequency characteristics are flat from 1 Hz to DC component. Generally speaking, a brand-new spring sensor has large and nonlinear drift. The value usually becomes lower and linear with aging, but it takes 1 - 2 years. Therefore, if a retired L&R G-type gravimeter is available, one can get a ready-to-use gPhone at cut-throat price (about 60 percent of fully brand-new).

From the introduction to this time, the gPhone has been operating at a measuring room in a building of Mizunami Geoscience Academy while tilt-adjustments were sometimes performed. The derived data collected until very recently (January 15) have been polluted by improper tilt corrections, which include three-times parallel measurements with the FG5 absolute gravimeter (#225). After the last tilt-adjustment, however, residues that reduced theoretical tides (solid earth, ocean load, and polar motion), atmospheric pressure, and tilts (cross and long) from raw gravity observation values have been fluctuating around 1 - 2 micro-Gal except linear drifting. The drifting rate is less than about -1 micro-Gal / day. Accordingly, gPhone might be possible to detect sub-micro-Gal gravity variations if an ideal environment of very low temperature change (and / or insolation) effects is available.

In the near future, TRIES plans to install the gPhone in our observation cave, accompanying occasionally parallel running with FG5. After that, we hope to collect steady-state operating data for long time in the interior of Mizunami Underground Research Laboratory of Japan Atomic Energy Agency to study gravitational effects of inland water, coseismic groundwater response, crustal movement, and so on.

Keywords: continuous gravity measurement, relative gravimeter, gravity monitoring