[EJ] Evening Poster | S (Solid Earth Sciences) | S-GD Geodesy

[S-GD01]Gravity and Geoid

convener:Takayuki Miyazaki(Geospatial Information Authority of Japan), Keiko Yamamoto(National Astronomical Observatory of Japan)

Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Recent precise gravity measurements lead to advances in many kinds of applications, e.g., investigation of internal structure of the Earth and Moon, studies of earthquake, volcano, subsidence, landslide and tsunami, monitoring ice mass balance, and so on. In this session, we call wide range of papers related to topics of gravity and geoid, including theory of gravity field, absolute/relative gravity measurements/observations, data analysis of satellite gravity missions, and development of gravity sensors.

[SGD01-P02]Preliminary gravity monitoring by using the superconducting gravimeter iGrav without the helium refrigeration system

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Keywords:Superconducting gravimeter, Gravity monitoring, Helium refrigeration system

Microgravity monitoring is a valuable tool for mapping the redistribution of subsurface mass associated with geothermal exploitation, hydrocarbon production, volcanic activity, groundwater movement, and other subsurface processes. The superconducting gravimeter is currently the most precise gravimeter and thus is a useful instrument for microgravity monitoring. In this study, we tested a method of measuring gravity changes by using the superconducting gravimeter iGrav manufactured by GWR Instruments from which the helium refrigeration system (cryogenic refrigerator and compressor) was removed to make it more portable. The iGrav was installed in the Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba. Gravity monitoring was conducted for 6 days. Helium level in the dewar after the measurement was 40 %. The measured gravity changes were almost consistent with the calculated gravity changes by the GOTIC2 program (Matsumoto et al., 2001). Two weights were placed at a distance of 10 and 40 cm from the upper end of the iGrav to check whether or not the measured gravity changes caused by known changes in mass distribution were explained quantitatively. The measured gravity change (0.9 μGal) was consistent with the calculated one (0.8 - 1.0 μGal). For further studies, applying the method of measuring gravity changes by using the iGrav without the helium refrigeration system to a field-scale study is required.

References:

Matsumoto, K., Sato, T., Takanezawa, T., and Ooe, M. (2001), GOTIC2: A program for computation of oceanic tidal loading effect, Journal of the Geodetic Society of Japan, 47, 243-248.