

JGEOID2024: the Japanese gravimetric geoid model incorporating nationwide airborne gravity data

K. Matsuo⁽¹⁾

(1) Geospatial Information Authority of Japan, Kitasato-1 Tsukuba Ibaraki Japan, (matsuo-k96s4@mlit.go.jp / +81-29-864-6280)

This study presents a Japanese gravimetric geoid model JGEOID2024 that incorporates nationwide airborne gravity data. First, we show the results of the accuracy assessment of the collected airborne gravity data. We here used two approaches for the assessment: cross-over validation and comparison with terrestrial/GGM gravity data. The former represents data repeatability, and the latter represents absolute certainty. The cross-over validation was performed by evaluating gravity differences at cross-over points between survey lines and validation lines. The comparison with terrestrial/GGM gravity data was performed using the three-dimensional least-squares collocation method with surface gravity data and EGM2008 over a land area. As a result, we confirmed that our airborne gravity data have a repeatability of 0.8 mGal and an absolute certainty of 1.4 mGal. Then, we show the results of the geoid computation and the accuracy assessment. The computation method was the remove-compute-restore Stokes-Helmert scheme with the hybrid Meissl-Molodensky modified spheroidal kernel. We found that the impact of introducing the airborne gravity data on the geoid computation ranged from -25 cm to +23 cm, with the impact being especially large in coastal areas around the inland sea and bay. We confirmed that our new gravimetric geoid model has an accuracy of approximately 3 cm by comparison with GNSS/leveling geoid height data. The new gravimetric geoid model will be used for the modernization of the height reference system in Japan.

Keywords: Regional geoid modelling, Airborne gravimetry, Height modernization