

Influence of ground clearance on airborne gravity gradiometry survey

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In geophysical surveys, increase in the distance between the sensors and the survey targets generally causes deterioration of resolution. Higher altitude above the ground level leads to degraded resolution in airborne surveys. While low-level flight is desirable for high resolution measurements, the ground clearance in actual surveys can increase to avoid rugged terrains, tall trees and high-rise structures including power lines. While the influence of higher clearance can be estimated by upward-continuing the gravity data to the flight surface, only a few case studies based on actual surveys are found.

Japan Oil, Gas and Metals National Corporation has been conducting airborne gravity gradiometer (AGG) surveys at the nominal terrain clearance of 120 m in the geothermal potential evaluation projects by using heliborne geophysical methods. We collected AGG data by varying the ground altitude at 120 m, 250 m, 500 m and 750m for the purpose of directly evaluating the influence of flight height on the vertical gravity gradient component (GDD) and vertical gravity (gD).

In the survey results, we observed a significant loss in the resolution of GDD due to the increased flight height, compared with that of gD. We plan to compare the measured results at each altitude with the calculated values by upward continuation of GDD and gD at 120m.

Keywords: Airborne Gravity Gradiometry, Vertical gravity gradient, Flight height