Effect of lateral topographic density variations on subsurface structure estimation by gravity inversion – a case study in Aso Caldera, Japan

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Gravity data observed on the topographic surface is strongly influenced by the gravitational attraction of topography. Therefore, the appropriate correction of the gravitational attraction of topography to gravity data is a key to subsurface structure estimation of the ground by gravity inversion. The gravitational attraction of topography, or topographic gravity effect, is commonly computed from a topographic elevation model under an assumption of a constant density (2,670 kg/m3). This assumption is inappropriate in volcanic regions with variable geological structures. In this study, we compute the topographic gravity effect considering a laterally varying topographic density, and investigate this effect on the subsurface structure estimation by gravity inversion. The study area is the Aso Caldera of Japan where the various geophysical and geologic data are available.