

Gravity anomaly and the subsurface structure in the southwestern Kaga region, Ishikawa Prefecture, Japan

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In the southwestern Kaga region, there are thermal springs, Katayamazu, Yamashiro, and Awazu hot springs, with high water temperatures and abundant water volumes. However, their origins and any structures which are responsible to the thermal phenomena remain unknown. In order to understand them, we investigate the subsurface structure using gravity anomaly analysis.

A total number of the gravity measurements is 1029 in the study region (40kmx40km), including new 133 data and 896 data which have been obtained by Kanazawa University. Bouguer gravity anomalies are calculated by assuming a crustal rock density of 2670 kg/m^3 . The obtained gravity anomaly map shows that there is a circular area with negative anomalies whose diameter is about 10 km. The thermal springs are located within this circular area. No corresponding structure or topography is observed on the surface. The anomaly distribution suggests that a crater-like structure with a diameter of about 10 km is buried beneath the region.

In this study region, Quaternary rocks and Miocene pyroclastic rocks outcropped in a plane near the coast and a mountainous region, respectively. The geological boundaries are nearly parallel to the coast line. The crater-like structure excavate the pyroclastic rocks. Such geological conditions and the existence of the thermal springs probably suggest that the structure has originated from a caldera in Miocene. The depth of the basement rock in the crater-like structure is estimated to be about 2 km from the gravity anomaly.