

Gravity anomaly around the Ohmi district, Niigata prefecture, central Japan

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Mountainous regions in the Chubu district, central Japan, show, roughly speaking, isostatic compensation of gravity anomalies. That is, lower gravity anomalies are observed over higher altitude regions, and reversely, higher gravity anomalies over surrounding regions. Furuse and Kono (1984) demonstrated that the isostatic compensation stands in the Chubu mountainous region, at least over 300 km in wavelength. Some region, however, shows out of this regional tendency. The Ohmi district, the northern end of the North Alps, is one of those exceptions. In this region, the high Bouguer anomalies over 50 mGals are observed in spite of the high altitude over 1200 m.

The topography of the researched area is very steep. Many landslides and washouts had been occurring along the Himekawa River, which runs through this area along the Itoigawa-Shizuoka Tectonic Line. The steep topography of the Northern Alps is abruptly cut off by coastline, and the bathymetry is deepens rapidly toward offshore.

Geology around the Ohmi and Itoigawa region shows complexities. Eastside of the Itoigawa-Shizuoka Tectonic Line is composed of the Neogene sediments. Westside is mainly composed of older rocks. Crystalline schists are surrounded by the Jurassic sediments (Kuruma and Tedoru groups) and intruded by serpentines. Occurrence of jadeite is also reported in this region. The various old rocks around the region forms so called melange, the tectonic mixture.

In order to clarify the cause of this anomalous distribution, gravity measurements were made in this mountainous region. Some of the measurement point was carefully decided with GPS positioning. The datasets from other institutes are also compiled. By applying the terrain correction using 50mDEM (Honda and Kono, 2005) to all of the compiled dataset, the gravity anomaly map was much improved.

The highest gravity anomaly is appeared approximately over Mt. Shiratori. The high gravity anomaly region is about 50 mGals in 40 km diameter. Except for the southwestern high extension, Bouguer anomalies rapidly decrease to minus values.

Referring with geology and crustal structure deduced from explosion seismology, we construct a density structure model. It is surely proved that very high density rocks should exist quite close to the surface in this region.

References

Honda, R. and Y. Kono, 2005, Synthesized Land and Sea 50M Digital Elevation Model and Terrain Gravity Correction in and around the Japanese Islands, *J. Geod. Soc. Japan*, 51, 33-44.

Furuse N. and Y. Kono, 1984, Isostasy in central part of the Japanese Islands, *J. Seism. Soc. Japan, Ser. II*, 37, 569-578.