

# Crustal structure in northern Hokkaido based on gravity and magnetic anomalies

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A seismic zone exists around the Kitami mountainous district on the east side of Northern Hokkaido. In contrast, a lot of microearthquakes are observed around the Hokkaido central metamorphic belt to the Japan sea side. Moreover, this region situated in the Japan sea east edge active belt.

The crustal structure analysis using gravity anomaly data and magnetic anomaly data was performed in this area. We compiled pre-existed gravity data by Hokkaido University as well as Geological Survey of Japan (GSJ) (2000) to reveal a fine structure around this area. Aeromagnetic data collected by GSJ in the Tenpoku area (observed in 1974), Kitami (2. Monbetsu) area (observed in 1978), Soya-Abashiri sea area (observed in 1971), and Wakkanai-Sapporo sea area (observed in 1970) was used as magnetic anomaly data set. Among these magnetic anomaly data set, data sets in Tenpoku and Kitami areas are observed at 5000feet high, but, data sets in Soya-Abashiri and Wakkanai-Sapporo sea areas are observed at 1500feet high, thus we made upward continuation to arrange same altitude of 5000feet high. Moreover, to treat magnetic anomaly data as a scalar, we made reduction to the pole.

The structure analysis was performed in land from the Japan sea coast to the Okhotsk sea coast along the 45 degrees N line using The Talwani method. The shape of structure was assumed to be a rectangle. Geological boundaries were roughly read from the geologic map, and we used them as an initial model. As a result, gravity and magnetic anomalies are explained by density and susceptibility distribution up to about 3km depth.

The serpentinite distributed characteristically in the central metamorphic belt coincides with the high density and high magnetic susceptibility region. In addition, the Quaternary and Neogene formations distributed on the west side are corresponding to a low density and low magnetic susceptibility structure. The Omagari fault strikes almost along the boundary of the low density structure on the 45 degrees N. Moreover, the distributions of the Sarabetsu and Yuchi formations are corresponding to those of the low density structure of the west side of central metamorphic belt. Comparing the result of seismic reflection survey conducted by Japan Nuclear Cycle Development Institute, we recognized the low-density (light) sediments gradually increase their thickness westward and take the maximum value (2.5km) around the west end of the profile.

Some evidences such as thicker sediment layer and high seismicity in the west side, suggest that the active crustal movement has continued to present time in this area.