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Gravity and Magnetotelluric survey over the Kutcharo caldera, eastern Hokkaido

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Kutcharo caldera, eastern Hokkaido, was formed during 0.5 ~ 0.035 Ma. Several recent researches clarified its complex history of caldera-forming eruptions and the post-caldera igneous activities during the Quaternary. For the confirmation of the caldera-forming model, which was constructed from geological fieldworks and geochemical analyses, we need geophysical approach. We carried out gravity survey and magnetotelluric survey. Simultaneously we compiled all available gravity data. The final purpose of this study is to construct precise subsurface structure model around the region.
The gravity survey was conducted during 2005 to 2009 with Scintrex CG-3 type gravimeter. We used dual band GPS receiver to decide the altitudes of observation points. Some of the data are obtained for the purpose of detecting active faults. Total 519 observation data is reduced to Bouguer anomaly data. Terrain correction is calculated with 50 m DEM and we also adopted the lake water correction. As depth of the caldera-lake is very deep, it is important to take into account the attraction of the lake water to assume mass defect of the caldera. The lake DEM is constructed by tracing the depth contour of the published lake map. Compiled gravity data are as follows. The data from Geological Survey of Japan, Geographical Survey Institute of Japan, JAPEX, NEDO, Gravity Research Group for Southwestern Japan, unpublished data obtained by Hokkaido University and published dataset from various research over eastern Hokkaido. We also adopted terrain correction and lake water correction for all of these data. Obtained Bouguer anomaly map shows the clear agreement with surface geology and also shows the benefit of the lake water correction.
The Magnetotelluric survey was conducted during September 2009. We installed total 16 observation stations. Observation period is 3 days for each station.

Keywords: caldera, gravity anomaly, magnetotelluric survey, subsurface structure