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Density structure inferred from gravity CG inversion with initial density model derived from velocity structure of seism

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The seismic survey across Yufuin basin was carried out in order to reveal the underground structure. The result indicated shape of the Yufuin basin filled by sediments from few continuous seismic reflectors and revealed the low velocity subsurface layer (Yusa et al, 1995). However, the other structure was not identified due to poor reflectors the outside of the basin. This is because several volcanic deposit units, which has less physical property contrast among volcanic units. The two dimensional forward gravity modeling revealed the configuration of the Yufuin basin and half graben structures the outside of the basin (Kusumoto et al, 1996; Inoue et al, 2004; Inoue et al, 2006). These analysis applied polygon modeling. The inversion of polygon model is non-linear problem. On the contrary, the inversion of cell modeling (consists of small density bodies) is approximated to the linear inversion problem. The inverted results depend on initial models based on iterative methods such as a Conjugate Gradient (CG) method. The gravity data of the Yufuin basin was inverted with the CG method. The initial model was constructed from the velocity structure based on the velocity analysis of the seismic reflection analysis. The result was similar half graben structure to the previous studies.

Keywords: Yufuin basin, Seismic reflection survey, Gravity analysis, Conjugate gradient method, inversion