Segmentation of the Kitakami Lowland western marginal fault zone, northeast Honshu, Japan

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The western marginal faults of the Kitakami Lowland constitute an active fault zone extending almost north to south from the west side of Yahaba to the south of Isawa in Iwate Prefecture consists of various faults such as Uwandaira fault and Detana faults. They have been believed to originate from normal faults caused by E-W extensional stress field during middle Miocene, and to activate as reverse faults under E-W compressional stress field since Pliocene. Several researches have been done so far, but it is not yet clear how the underground geological structure continues. We have inferred a two dimensional subsurface density structures by gravity survey, and have proposed interpreted geological structure along several survey lines, in and around the Kitakami Lowland western marginal fault zone. In this paper, we attempt to clarify the structural continuity of the zone by synthesized these data.
The gravity surveys were conducted along four survey lines trending E-W, which are named from the south to the north, Isawa(59 km long), Kanegasaki(12 km long), Geto(9 km long), Waga(12 km long). In the ‘Mizusawa survey line’, we use Lacoste-Ronberg type gravimeter owned by Earth Science Research Institute, and in other lines, we conducted gravity survey with a Sintrex gravity meter CG-5. The typical interval of observation sites is 200 m. The elevation of the observation sites was surveyed with RTK-GPS. We assumed that the density for Bouguer and terrain corrections were 2.2 g/cm^3.
For the Mizusawa, Waga, and Kanagasaki survey lines, a density structure model was created in consideration of the reflection seismic section. For all line, three layers with different densities were assumed, and the density of the third layer corresponding to the basement rock was 2.7 g / cm^3. As a result of comparison under the above conditions, the inferred geological sections along the Geto and Waga lines, and those along the Kanegasaki and Mizusawa lines showed continuity. In the former areas, there are two half-grabens whose boundary fault in the eastern margins are inverted to reactivate as thrusts. In each of the latter, areas there is one half graben, with a reactivated boundary fault. Therefore we conclude that there is the segment boundary of the Kitakami Lowland western marginal fault zone between Geto-Waga and the Kanegasaki-Mizusawa area.

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