Gravity survey across the northern region of Senboku Graben along southern area of central Osaka bay

*Kunihiro Ryoki[1]

1. Institute of Geoscience and Electric Resource Science, Department of Electric and Electronic Systems, Hyogo Polytechnic Center

1. Summary
It is concerned that Earthquake damage due to a buried active fault which is not well known in the city on the sedimentary basin, where the population is concentrated. It is an urgent task to grasp the basement structure at these places. Recently the author has clarified the gravitational structure of the Uemachi Fault Zone in the Senboku area of Osaka (eg, Ryoki (2011), Ryoki (2015), etc.) Along the bay area of Takaishi, the graben structure was estimated in gravity measurement (Ryoki, 2016), and then the position of the northern margin of the coastal area of the Uemachi Fault Zone (Yoshioka et al., 2013) was confirmed. This time, the gravity has been measured along east-west survey line set to place about 3 km to the north of Ryoki (2016) 's survey line.

2. Target area
The survey line (Fig. 1) lay about 8 km east-west from east end of Gakuen-cho, Naka-ku, Sakai City, to the quay of Hamadera waterway in Hamaderakoen-cho, Nishi-ku. Among this, the 2.2 km, from the west point of Ishidu rever to the south point of Hamadera Koen Station, almost coincides with Sakai 2nd survey line of seismic reflection method (Sakiyama, 1997).

3. Method
LaCoste & Romberg relative gravimeter G-308 was used for the gravity easurement. Measurement points were the baseline standard point of the Geospatial Information Authority of Japan (GSI) and the reference point / auxiliary point of the public block area in principle. The survey results of these points were used for gravity correction. When the auxiliary point of the block district survey was lost, its original position was confirmed on the map and it was set as the gravity measurement point. No terrain correction has been added to measurement value because there was regarded as plains.

4. Result
Fig. 2 shows the results of free air anomalies and simple Bouguer anomalies projected in the east-west direction. The horizontal axis in Fig. 2 is the distance from the west end of the survey line. Fig. 1 also shows the location of the estimated active fault (1) located near the distance of 0.40 km, which indicated by Yoshioka et al. (2013). And in the vicinity of 0.96 km a concealed active fault (2) with active flexure accompanying this, an active fault (3) with somewhat inaccurate location near 1.68 km, around 3.60 km active fault (4) whose position is somewhat unclear. All of these faults are orthogonal to the current survey line in general.

5. Conclusion
Among the results shown in Fig. 2, it is due to the terrain effect of Hamadera Waterway with a width of 170 m or more that the Bouguer gravity anomaly shows low value at the start of the survey line. From the Bouguer anomaly distribution shown in Fig. 2, it is suggested that the fault (3) has west fall and the fault (4) has east fall. On the other hand, the gravity anomaly value rises smoothly from around the distance of 4.00 km. This suggests probably due to the fact that the survey line is along the outer circumference of

the Mikunigaoka high gravity anomaly area.

In order to conduct a more detailed discussion based on the above measured values, it is necessary to apply terrain correction and earth gravity correction. In addition, dense gravity measurement should be done to acknowledge that the graben structure lay under the west side from the Hamadera Waterway, where is a petroleum or other chemical industry complex that is located in a vast landfill site and it is a difficult area for outsiders to enter for security.

References

Geospatial Information Authority of Japan (GSI) (2017) : Reference point result browsing service, http://sokuseikagis1.gsi.go.jp/index.aspx.

Iwata, T. *et al*. (2013) : Preponderant Investigation in Uemachi Fault Zone, 2010 - 2012, p. 66 - 163.

Nakata, T. *et al*.(1996) : 1:25,000 Osaka Seinen-Bu, Active Fault Map in City Zone, D1-No. 333.

Ryoki, K. (2011) : Journal of Kinki Polytechnic College, vol. 19, p. 18 - 19.

Ryoki, K. (2015) : Japan Geoscience Union 2015 convention proceedings, SSS31-P05.

Ryoki, K. (2016) : Japan Geoscience Union 2016 convention proceedings, SSS26-P01.

Sugiyama, Y. (1997) : Research materials of active fault, p. 105-113.

Yoshioka, T., *et al*. (2013) : Preponderant Investigation in Uemachi Fault Zone, 2010 - 2012, p. 5 - 65.

Keywords: Osaka Plan, Uemachi fault zone, subsurface structure, reverse fault, digital geographic information, public control point

図１　重力測定点の位置　A–A'：今回の測定点，B–B'：領木(2016)の測定点

Fig. 1 Position of gravity measurement points. A - A ': current measurement points, B - B': measurement points by Ryoki (2016).

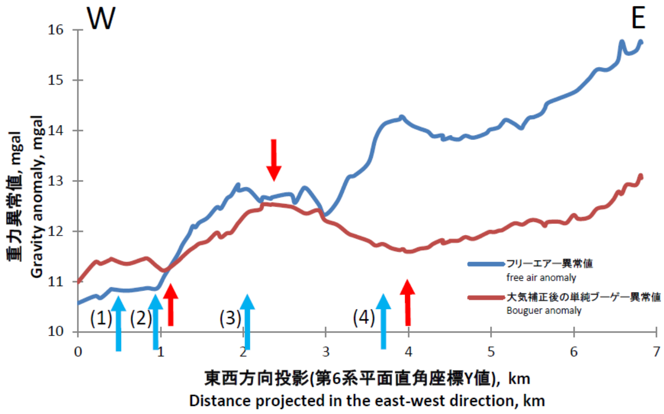

図２　重力異常稠密測定の結果 東西断面　赤色矢印は単純ブーゲー異常値の極値の位置を示し，青色矢印は吉岡・他(2013)による活断層位置を示す．

Fig. 2 Profile of gravity anomaly in dense survey East-West section. Red arrows indicate the points of the extremal value in the simple Bouguer anomalies. Blue arrows indicate the points of active fault (after Yoshioka, et al., 2013).

