

## **Seismic reflection surveys of the western and southern extensions (Futagawa and Hinagu active fault zone) of the 2016 Kumamoto earthquake source faults**

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The 2016 Kumamoto earthquake (Mw 7.0) ruptured about 34 km along the Futagawa (FT) fault zone and north segment of the Hinagu (HN) fault zone, which are major active fault zones in central Kyushu, Japan. The rupture did not extend neither to the western extension of the FT fault nor to the middle and south segments of the HN fault.

Seismic reflection surveys were conducted on the unruptured western extension of the FT fault and on the southern extension of the HN fault to reveal true locations of the active faults and to obtain finer image of the subsurface basin structure.

For the western extension of the FT fault, a seismic reflection survey was done using a P-wave vibrator along 17 km north-south survey line (Kumamoto-Uto line) traversing west of the Kumamoto plain (Shimizu et al, 2017). Shots by the vibrator made every 10 m interval were recorded at receivers located every 20 m. The time-migrated depth-converted image shows sedimentary basin structure down to 500 m from the surface. It also shows that the southern part of the sediments is deformed by normal faults. Newly found faults are located about 1.5 km north to the Uto segment, western extension of the FT fault estimated from the gravity anomaly data.

For the unruptured segments of the HN fault, seismic reflection/refraction survey were conducted along two survey lines, Uki line and Yatsushiro line, in the Yatsushiro plain using a P-wave vibrator (Iwata et al., 2018). Both of the Uki line (4 km length) and the Yatsushiro line (7 km length) crossed the HN fault. The time-migrated depth-converted image revealed that 1) the bedrock depth varies from 0.3 to 0.6 km along the lines, 2) the bedrock surface deepens toward the HN fault, and that 3) pull-apart depression structure exists along the Uki line associated with a step-over of the HN fault.

### References:

- Shimizu H., Iwata T., Yoshimi M., Akinaga Y, and Suehiro M. (2017) Seismic reflection survey at the western Kumamoto plain, Kyushu: Kumamoto – Uto survey line, SSJ fall meeting, S22-P04.
- Iwata T., Yoshimi M, Asano K., Okamoto S., and Suehiro M. (2018) Seismic reflection/refraction survey in Yatsushiro sedimentary basin, Kumamoto, JpGU 2018 Meeging, SSS14-P06.

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