

Two-dimensional microtremor survey by chain array

*Tsuyoshi Haraguchi¹, Hisao Hayashi²

1. Department of Geosciences, Graduate School of Science, Osaka City University, 2. Geo-X Consultants Corporation

Chain array exploration is an extension method of microtremor exploration method by Dr. Hiroshi Okada's idea. The micromotor arrangement of the SPAC method based on a circular array can be replaced with a linear array of equilateral triangular arrays. From the dispersion curve obtained for each individual equilateral triangle, obtain the phase velocity distribution at each half of the side length. By connecting this phase velocity distribution along the survey line, a two-dimensional phase velocity cross section is obtained.

In this study, we show three cases. The first case is a near surface exploration of the crack zone in the Aso caldera caused by the 2016 Kumamoto earthquake. Detailed phase velocity distribution up to 30 m near surface was obtained with a line arrangement orthogonal to the cracks. We created a detailed 3D terrain model using UAV and captured the exploration cross section and visualized it. As a result, we obtained a low velocity distribution (Fig. 1a) that almost coincided with the cracks and graben.

Next are two cases, aiming at the visualization of the buried valley structure. An embankment road in Hashima, the buried valley was confirmed on the western end of the survey line (Fig. 1b) and in the Ikeda pond was almost in the center (Fig. 1c). In any of the chain array exploration, we obtained two - dimensional phase velocity distribution was effective as information of near surface.

Keywords: microtremor survey method, chain array, near surface

