Possibility of estimating phase velocity of Love wave using Horizontal components in microtremor array surveys in the case of Nishio

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1) Introduction

The S wave velocity structure of sediments is the most important factor for amplification of earthquake motions. In recent years, microtremor array surveys have been popularized because the S wave velocity structures can be estimated by simple measurements and at a low cost. For example, Horike (1985) inferred the S wave velocity from f-k spectra estimated array microtremors and Aki (1957) and Okada (2003) also inferred them from the spatial autocorrelation functions (SPAC). These approaches use vertical microtremor array recordings and discard horizontal-component recordings. As is well known, the phase velocity of Rayleigh waves is influenced not only by the S-wave velocity structure but also by the P-wave velocity structure, while that of Love wave is influenced by the S-wave velocity structure alone. Therefore, it is expected that S wave velocity structure can be obtained clearly by estimating the velocity structure using the dispersion of the Love wave. Several approaches are developed for inference of the phase velocity of Love waves, for example f-k method by Tsuchida et al (2016), SPAC and CCA method by Tada et al (2010; using the microtremor array analysis tool "BIDO 2.0" software). The aim of this study is to compare the phase velocities obtained using the same arrays.

2) Observation and data

For this comparison, we implemented microtremor measurement in Nishio City, Aichi Prefecture, using different-size array composed of 7 stations. At each station 3-component velocity sensors were installed. Microtremor recording were acquired at a sampling interval of 0.005s for 30 minutes. This site is suitable for this comparison, because there is much information about geotechnical and geological property.

3) Results

At the present, the phase velocity by the f-k method is estimated, but it is still in the process of analysis. Therefore, by the day of the presentation, we will proceed with the remains to do.

Keywords: microtremor array surveys, Love wave, Horizontal components