

A Spectral Evaluation of Subsurface Structure at the Campus of Meijo University by Microtremors Observation

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1 Introduction

Characteristics of subsurface structure can be obtained by observing microtremors, and this is very useful to estimate the ground shaking at the time of large earthquakes. Since microtremors are easily observed anytime and their spectral features are obtained even with one seismograph, so it is convenient and useful if we could get significant information about subsurface structure from spectral features at one single point effectively. Here we have tried to evaluate the subsurface characteristics from the power spectra of microtremors observed with one acceleration seismograph.

2 Observation

We installed 13 observing points at the campus of Meijo University in 2002 and observed microtremors with one SMAC-MD digital strong motion seismograph. We have repeated same observations in 2004.

3 Method of Analysis

After eliminating especially noisy data, we have calculated power spectra at the 13 observing points by using data of 20 seconds. We have divided the frequency range of 0.02 to 30 Hz into three frequency zones L, M and H, namely 0.02 to 1.0Hz, 1.0 to 5.5Hz and 5.5 to 20.0Hz, and obtained sums of power spectra within respective zones. These sums are compared with the height differences of topography before and after the campus construction, and their usefulness was evaluated in order to estimate subsurface structure.

4 Results

It is apparent that large sums in the L zone correspond to the cut place and those in the M and/or H zones the filled place in our investigation. Since filled places are considered as covered with soft soil, thus the present method is concluded to be simple and useful for quick and local evaluation of the ground shaking at the time of large earthquakes.