Estimation of surface earthquake record at MeSO-NET observation points

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1. Introduction
In this research, in order to predict the state of shake of the ground surface with high precision from the data of the underground seismometer installed at the depth of 20 m of MeSO-net, microtremor observation at each observation point and temporary observation at the surface By observation, we evaluate the ground amplification characteristics and estimate the S wave velocity structure of the ground. As research and development items for that, 1. Acquisition of surface earthquake record and estimation of amplification characteristics at MeSO-net observation point, 2. Estimation of geophysical properties such as microtremor array observation and S wave velocity structure.The following section introduces efforts for each item.

2. Acquisition of surface earthquake records and estimation of amplification characteristics at MeSO-net observation point
In this item, in order to estimate the ground-to-ground spectral amplification factor for each observation point by temporary seismic observation at the MeSo-net observation point, it was conducted at all MeSO-net observation points (297sites) There. The observation period is 2 to 3 months per point, and observation is completed at 60 points. For each target observation point, one seismometer (JU 310 and JU 410 manufactured by Hakusan Kogyo Co., Ltd.) having the same sensor as the MeSO-net seismograph was used. In addition, the sampling frequency at the time of data acquisition was set to 200 Hz and the range was set to ±4.0G (± 1.0 G for JU 310) for JU410. Amplification characteristics are calculated by calculating the Fourier spectrum for each component from the seismic waveform obtained in the ground and the surface at each observation point, applying a bandpass filter of 0.1 to 10 Hz, smoothing in a logarithmic window, The ratio was taken. As a result, the difference in amplification characteristics between the relatively hard Rohm plateau sites and the soft backward swamp and natural embankment sites.

3. Microtremor array observation and estimation of ground physical property values such as S wave velocity structure
To verify the ground amplification characteristics of the previous section and make it possible to assume the shake even under strong ground motion, microtremor array observation to obtain the S wave velocity structure of about 50 m underground was carried out. Microtremor observation purchased a three component seismometer/ microtremor observation device (JU410) with the same sensor characteristics as the MeSO-net seismograph. Using them, microtremor array observation is carried out just above 296 points of the target MeSO-net observation point. In the fine motion array, we deployed a 4-point extremely small array with an array radius of 60 cm and a 3-point irregular array with about 5 to 15 m on each side, and observation was done for about 15 minutes at the same time. In addition, the ground physical property values such as the S wave velocity structure were estimated using inverse analysis methods such as extraction of amplification characteristics of AVS30 etc. (C40), direct curve transformation method of dispersion curve, inverse analysis and the like. As in the previous section, the difference between the characteristics of the relatively hard Rohm and the soft backward swamp are clear.

4. Conclusion
Based on the seismic observations and microtremor observations carried out up to the previous section, we will consider the ground amplification factor considering the period in the future, but we will consider the past ground model (SIP) of the existing Kanto region We will further improve the S wave velocity structure model using the shallow / deep integrated subsurface structure model of the Kanto region implemented in the real-time earthquake damage estimation) and estimate the highly accurate seismic motion at 250 m mesh interval The goal is to do.

Keywords: earthquake observation, microtremor, subsurface velocity structure

