CONSTRUCTING A SYSTEM TO EXPLORE VELOCITY STRUCTURES USING A MICROTREMOR OBSERVATION

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Our final goal is to provide quantitative information on subsurface S-wave velocity structures in response to a variety of social needs regarding geological and soil matters. Since S-wave velocity is a physical property directly related to site amplification and ground stiffness, it is expected to contribute to, for example, improving accuracy of seismic zoning for the mitigation of earthquake disasters. Currently, we are constructing a system for observation and analysis of microtremors to explore S-wave velocities within the depth range from several to tens of meters on the basis of 15-minute observations with a miniature seismic array having a radius of 0.6 m. The simplicity and objectivity of our system affords automization and quality control, with an expected capacity to acquire large amounts of microtremor data.
We have ever collected bore-hole data and soil physical properties data, and then, by using them, have constructed initial geological models of subsurface structure from seismic bedrocks to ground surfaces in some areas of Japan, which have thicker sedimentary layers.
At present, we are constructing models of subsurface structure in wide area for Kanto and Tokai region of Japan as part of the national project, “Reinforcement of resilient function for disaster prevention and mitigation.”
In this study, at first, we collected as many records as possible obtained by microtremor and earthquake observation in the whole Kanto area, including Tokyo. And then, using geological models based on the results of boring surveys as reference, subsurface structure model from seismic bedrock to ground surface was improved based on records of microtremor array and earthquake observation in those areas.

Keywords: microtremor observation system, underground structure models, miniature array

