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BUTSURI-TANSA(Geophysical Exploration)

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[\[Image PDF \(1099K\)\]](#) [\[References\]](#)**A joint inversion of apparent resistivity and peak-period of microtremor horizontal-to-vertical spectrum for shallow soil profile**Hiroaki Yamanaka¹⁾, Shun'ichi Fukumoto²⁾ and Kiyoshi Irie²⁾

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ABSTRACT We propose a new technique for a joint inversion of apparent resistivity data from a vertical electrical sounding and peak-period of spectral ratio of horizontal microtremors to vertical one in order to infer resistivity and S-wave profiles simultaneously. Least-squares errors between the observed apparent resistivity and theoretical ones are minimized together with errors between the peak-periods of the horizontal-to-vertical spectrum of microtremors and theoretical ellipticity for fundamental-mode Rayleigh wave. We use a Simulated Annealing to minimize the misfit function defined by the summation of the two least-squared errors. First, we confirmed the performance of the method using synthetic data for a shallow soil model. The method reconstructs well the soil model, even though synthetic observed apparent resistivity data are incomplete. We, then, apply the method to actual observed data at a site in reclaimed area in Yokohama, Japan. The obtained profiles are in good agreements with results of geological and PS loggings. It is concluded that the proposed technique can be addressed as one of the easiest methods to infer shallow S-wave and resistivity profiles simultaneously.

Key words: microtremors, horizontal-to-vertical spectrum, S-wave velocity, vertical electrical sounding, resistivity, simulated annealing

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