# Frequency characteristics of the incoherent waves in the vertical array strong motion records

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[1] none

Strong ground motions observed by the vertical arrays more or less involve the incoherent waves which have no correlation between the array points [Izumi et al., 1989]. These waves behave as noises when we interpret the vertical array data using a simple wave propagation theory and prevent us from estimating correct values of the ground parameters such as the wave velocities and the damping coefficients [Ikeura, 2005]. In this study, the damping coefficients of the ground layers are evaluated from the coherent waves in order to reveal the effect of the incoherent waves on the estimation of the ground parameters, and the frequency characteristics of the incoherent waves are discussed. The ground parameters at seven sites in Sendai are optimized using the transfer functions of the coherent waves estimated from the strong motion vertical array data at these sites. The damping coefficients of the ground models evaluated are significantly smaller in the lower frequency range than those obtained by usual optimization analyses using the simple spectral ratios of the observed strong motion records. This indicates that the damping coefficient of the ground materials does not show so strong frequency dependent characteristics as known in the previous studies. Using the models the amplitude ratios of the incoherent waves to the coherent waves are examined. The results indicate that the amplitude of the incoherent waves is almost proportional to that of the up-going waves estimated from the coherent waves on the basis of one dimensional wave theory and that the factor is approximately expressed by a simple form as $\exp[a+b*f]$, where f is frequency and a and b are negative and positive constants, respectively.