Abstract :

The horizontal-to-vertical spectral ratios (HVSRs) of ambient vibrations are commonly used to observe soil resonance frequencies, which are revealed by HVSR curve peaks. These resonances have been explained either in terms of S-wave transfer function or in terms of Rayleigh-wave ellipticity. In this study, ambient vibration recordings have been carried out next to nine boreholes in the eastern Mitidja basin (Algeria), all of which have been characterized by downhole geophysical surveys. Using velocity profiles obtained from the downhole surveys, we compare the frequency of the second HVSR peak (f(HV)) to frequencies obtained with (1) the time-averaged velocity (f(T)), (2) depth-averaged velocity (f(D)), (3) the SH transfer function (f(SH)), and (4) the fundamental-mode Rayleigh-wave ellipticity (f(E)). We find that f(SH), f(T), and f(D) fit well with f(HV), whereas this is not the case for f(E), implying that the HVSR peak frequency is better explained by the SH transfer function peak than by the Rayleigh-wave ellipticity.