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Site effects in Romania based on ambient vibration measurements and small earthquake recordings

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Strong earthquakes from the last two decades (e.g. the 1985 Guerrero Michoacan earthquake, Mexico, the 1994 Loma Prieta earthquake, California, the 1995 Kobe earthquake, Japan) have outlined the influence of the local geological conditions on the ground motions during the earthquakes. In Romania, the studies of the 30 August 1986 (Mw = 7.2) and 30 May 1990 (Mw = 6.9) earthquakes have also shown the important role played by the local and regional conditions in the distribution of the Vrancea intermediate earthquake effects (Mandrescu, 1995). Vrancea is a particular seismic region situated at the SE-Carpathians bend and is characterized by a high rate of occurrence of large earthquakes in a narrow focal volume. The aim of our study is to investigate the ground shaking characteristics at more than 50 sites in Romania by applying the H/V spectral technique to ambient noise data (Nakamura's method) and to small Vrancea earthquakes (M 3.5-4.4), which occurred during the CALIXTO '99 tomography experiment (Wenzel et al., 1999). The results show in most of the cases that the H/V ratios from noise data present peaks which can be recognized in the H/V ratios from earthquake data as well. The application of the H/V-technique also reveals two hard rock sites having negligible site effects, which could be used as reference. Finally, we calculate the site responses with respect to the reference sites and compare the results with those obtained from the H/V technique.