Geophysical Research Abstracts, Vol. 7, 07313, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07313

Comparison between Ambient Noise Horizontal-to-Vertical Spectral Ratio and Theoretical Results in laterally varying Structures: The Case of the City of Thessaloniki (Northern Greece)

A. A. Panou (1,2), C. Cornou (3,4), N. Theodulidis (1), P. M. Hatzidimitriou (2), P.-Y. Bard (3,5), and C.B. Papazachos (2)

(1) Institute of Engineering Seismology and Earthquake Engineering, P.O. Box 53 Foinikas, GR-55102, Thessaloniki, Greece, apanou@lemnos.geo.auth.gr, (2) Geophysical Laboratory, School of Geology, Aristotle University of Thessaloniki, GR-54006, Thessaloniki, Greece, (3) Laboratoire de Géophysique Interne et Tectonophysique (LGIT), Maison de Géosciences, BP53X, 38041 Grenoble Cédex9, France, (4) Institut de Recherche pour le Développement (IRD), Paris, France, (5) Laboratoire Central des Ponts et Chaussées (LCPC), Paris, France

We study the shape of the horizontal-to-vertical ambient noise spectral ratio in an attempt to detect lateral discontinuities in the downtown district of the city of Thessaloniki (Northern Greece). Ambient noise synthetics have been produced by using the numerical codes developed within the SESAME (Site EffectS assessment using AMbient Excitations) European project. The noise sources are approximated by surface or subsurface forces, distributed randomly in space and time, with random direction (vertical or horizontal) and amplitude. The time function is either a delta-like signal (impulsive sources) or a pseudo-monochromatic signal, a harmonic carrier with Gaussian envelope. Computation of the associated wave field is performed using an explicit heterogeneous finite-difference scheme solving equations of motion in a heterogeneous visco-elastic medium with material discontinuities (Moczo and Kristek, 2002). As the subsurface structure is varying within the city, ambient noise is simulated for a large number of different velocity profiles, representative of different areas. Comparison between the actual and simulated horizontal-to-vertical spectral ratio outlines the reliability of H/V peak frequency in mapping the sediment variation thickness and the large sensitivity of the H/V peak amplitude to 2D or 3D structures.