ESC2016-663-1, 2016
35th General Assembly of the European Seismological Commission

35th General Assembly of the European Seismological Commission
4–10 September 2016 Trieste

HV-Inv: a tool for forward calculation of the HVSR and inversion of Vs structures under the diffuse field assumption

Antonio García-Jerez (1,2), José Piña-Flores (3), Francisco Sánchez-Sesma (3), Francisco Luzón (1), Mathieu Perton (3), Helena Seivane (1), and Manuel Navarro (1)

(1) Universidad de Almeria, Dpto. Química y Física, CITE II-A, La Cañada, Spain (agj574@ual.es), (2) Instituto Andaluz de Geofísica, C/ Profesor Clavera, 12, CP 18071, Granada., (3) Instituto de Ingeniería, UNAM, CU, Coyoacán, CP 04510, D.F. México.

A connection between the H/V spectral ratio of ambient noise (HVSRN) and the elastodynamic Green's function has been recently stated from the fundamentals of the ambient noise interferometry. Within this framework, we have developed and tested HV-Inv. This is a computer code for forward calculation of the HVSRN and inversion of Vs profiles for diffuse wavefields.

The forward-calculation method requires numerical computation of the imaginary part of the Green's functions in the frequency domain for coinciding source and receiver. The algorithm employed performs contour integrals in the complex wavenumber plane and separate calculation of the contributions of Rayleigh, Love, P-SV and SH waves. The stability of the algorithm at high frequencies is preserved by means of an adaptation of the Wang's orthonormalization method to the calculation of dispersion curves, surface-waves medium responses and contributions of body waves.

This algorithm has been combined with Monte Carlo sampling, simulated annealing, downhill simplex and interior point methods to make up a powerful tool for passive seismic surveying. We show examples of application to passive exploration of Campo de Dalías coastal plain (SE Spain).