



Seismic local site effects characterization in the Andarax River Valley (SE Spain) from ambient seismic noise

Enrique Carmona (1,2), Antonio García-Jerez (2), Francisco Luzón (1,2), Francisco Sánchez-Martos (3), Francisco J. Sánchez-Sesma (4), and José Piña (4)

(1) Dpto. Química y Física, Universidad de Almería, Almería, Spain (ecarmona@ugr.es, fluzon@ual.es), (2) IAG, Universidad de Granada, Granada, Spain (agjerez@ugr.es), (3) Dpto. Biología y Geología, Universidad de Almería, Almería, Spain (fmartos@ual.es), (4) Instituto de Ingeniería, Universidad Nacional Autónoma de México, D.F. Mexico, Mexico (sesma@unam.mx, ead2009@hotmail.com)

This work is focused on the characterization of seismic local effects in the Low Andarax River Valley (SE Spain). The Low Andarax River valley is located in an active seismic region, with the higher seismic hazard values in Spain. The landform is composed mainly by sedimentary materials which increase its seismic hazard due to the amplification of the seismic inputs and spectral resonances. We study seismic local effects in the Low Andarax River by analyzing the Horizontal-to-Vertical Spectral Ratio (HVSr) of ambient noise records. The noise data were recorded during two field campaigns in 2012 and 2013. There have been a total of 374 noise measurements with 15 and 30 minutes duration. The acquisition was performed with a Digital Broadband Seismometer Guralp CMG-6TD. The distance between measurements was about 200 meters, covering an area around 40 km². There have been 6 significant peak frequencies between 0.3 Hz and 5 Hz. It was possible to find interesting areas with similar spectral peaks that coincide with zones with similar microgravimetric anomalies at the alluvial valley. It is also observed a decrease in the frequency peaks from West to East suggesting increased sediment layer. We also compute the soil models at those sites where geotechnical information is available, assuming that the seismic noise is diffuse. We invert the HVSr for these places using horizontally layered models and in the imaginary part the Green functions at the source. It is observed that the *S* wave velocity inverted models are consistent with the known geotechnical information obtained from drilled boreholes. We identify the elastodynamic properties of the limestone-dolomite materials with a formation of phyllites and quartzite that form the basement of the depression, and those properties of the Miocene and Pliocene detrital deposits (marls, sandy silts, sands and conglomerates) that fill the valley. These results together with the observed resonant frequencies along the Andarax valley allow the construction of microzonation maps, which are very useful for public administrations and private geotechnical companies.

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