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Characterization of the sedimentary cover at Zafarraya Basin (Southern Spain) by means of ambient noise

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The sedimentary structure in the Zafarraya Basin, which is located in the south of Spain (the zone with the higher seismic hazard in the Iberian Peninsula), is studied using ambient noise. A reasonable fit among the frequency of the main peak in the horizontal to vertical spectral ratio for microtremors and the depth up to the bedrock is obtained from data of 17 sites where geotechnical information was available. An averaged velocity vs. depth function for the sedimentary cover is also derived for the basin under assumptions of lateral homogeneity in the nature of the soft materials and smooth vertical variations of velocity due to age or confining pressure. The measurement of microtremors at 86 uniformly distributed points let us provide a map of the sedimentary thickness based on the previously calculated relationships showing values higher than 200 m at the deeper zones. In order to improve the reliability of the results, the stability of the HVSR measurement was checked by means of time-dependent analysis of the noise records taking into account only clear peaks which frequencies are not ever corresponding to the absolute maximum of the horizontal power spectrum.