Seismic microzonation of the city of Elche (Spain) for earthquake loss estimation

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Elche town is located in the SE of the Alicante province (Southeast of Spain). This part of Spain is one of the most hazardous zones from the viewpoint of the seismic hazard. The current seismic normative assigns a PGA value of 0.20g (return period of 475 years) to this city being the maximum 0.23g in the city of Jacarilla (Alicante). The urban area comprises more than 20000 buildings with an important number constructed without seismic considerations. Therefore, a correct seismic microzonation will let us to establish the shear wave velocity, predominant periods and dispersion curves needed to compute accurately the ground motions scenarios in the city for an earthquake loss estimation (ELE).

We have tested several techniques: multichannel analysis of surface waves (MASW) and spatial autocorrelation (SPAC) and calibrated the results with geotechnical information. The dispersion curves were obtained in different wavelength ranges and finally the 1-D Vs model was computed for each final dispersion curve using an iterative process. Additionally, a map of predominant periods has been obtained for the city.

The sensitivity of the results according to the used techniques and the recording instruments has been analysed and its influence when computing earthquake damage has been addressed.