



Shallow structure of the Lower Tagus Valley (Portugal): contribution from ambient vibration and seismic refraction measurements

P. Teves-Costa^{1,2}, I. Rodrigues¹, M. García-Fernández³, J. Carvalho⁴

(1) University of Lisbon, Instituto Dom Luiz, Portugal

(2) Faculty of Sciences of Lisbon University, Portugal

(3) Institute of Geosciences (CSIC-UCM), Madrid, Spain

(4) National Laboratory for Energy and Geology (LNEG), Lisbon, Portugal

The Lower Tagus Valley (LTV), located in the central part of Portugal, has been the place of occurrence (epicentre location) of strong earthquakes that affected this region and the city of Lisbon (Portugal's capital) in the past. The January 31, 1531 earthquake was the strongest reported event and it produced large damage in the southern part of the valley, in particular in Lisbon. In recent years the seismic activity in the LTV is characterised by several small earthquakes. The last moderate-large earthquake occurred on April 23, 1909 ($M_w \approx 6.1$) and destroyed several small towns located in the valley. The seismogenic structures responsible for these large earthquakes is still under debate. Besides, this region can be also affected by large earthquakes originated at a far source, as the 1755 earthquake which source is located southern of Portugal mainland, in the Atlantic Ocean, about 250 km far from Lisbon.

In order to contribute for the understanding of the shallow structure of the LTV, ambient vibrations surveys (single-station and arrays measurements) and seismic refraction profiles were performed in several sites all over the valley.

The ambient vibrations data were analyzed and processed according to the procedures established in the framework of SESAME and NERIES European projects. H/V curves were obtained from the single-station measurements and the array data supplied Vs profiles derived from the dispersion curves obtained using SPAC and f-k methods. The combination of both approaches, together with the results obtained from shallow seismic refraction, contribute for the definition of the sedimentary structure of the LTV in the upper 30 meters. This methodology is presented for several sites in the Lower Tagus Valley region.

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