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Seismic ground motion scenarios in Lower Tagus Valley Basin

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Throughout its history the Lower Tagus Valley (LTV) has been struck by several earthquakes which produced important material damage and loss of lives: The 1st of November 1755 Lisbon earthquake and the 1969 earthquake (Mw=7.3), located in the SW Iberia Margin and the 1344, 1531 and 1909 (M= 6 to 7) with epicenter located inside the LTV basin. Since this region is the most highly populated region in Portugal, it is expected that an earthquake of similar magnitude of those that have occurred in the past will cause an enormous destruction and casualties. This fact makes LTV a high priority area for earthquake research in Portugal.
In order to overcome the problems related to the absence of geological outcrops, low slip-rates (<0,4 mm/year) and the processes of sedimentation and erosion, we use in this work seismic reflection profiles, potential field data, soundings, wells and geological cartography to obtain a map of the main seismogenic structures and to characterize their seismic potential [1]. Moreover, a 3D structural model has been developed for de LTV based on Seismic reflection, Seismic Noise and potential field data [2,3].
In order to improve assessment of the seismic hazard in the LTV basin, we simulate long-period (0-1 Hz) ground motion time histories for a suite of scenarios earthquakes (Mw =5.5 to 7) within the basin, using fault geometries and the 3D seismic velocity structure based on the previous mentioned works.

References

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