Geophysical Research Abstracts
Vol. 15, EGU2013-12809, 2013
EGU General Assembly 2013

Geomorphological analysis of the Lower Tagus Valley Fault Zone, Central Portugal.

Carolina Canora-Catalan, Glenda Besana-Ostman, Susana Vilanova, Joao Fonseca, Luis Pinto, Ana Domingues, Joao Narciso, and Patricia Pinheiro

Centro de Recursos Naturais e Ambiente (CERENA), Instituto Superior Técnico. Lisbon, Portugal. (carolina.catalan@ist.utl.pt)

The Lower Tagus Valley Fault Zone (LTVFZ) is a northeast-southwest trending tectonic structure located within the Lower Tagus Valley (LTV), in central Portugal associated with at least two historical events: the 1909 Mw 6.0-6.2 Benavente earthquake and the 1531 Mw 6.9 earthquake. Recent investigations indicate that the relatively linear valley associated with the Lower Tagus River is controlled by active faults in varying geometry and slip rates. Based on mapped traces, LTVFZ is about 80 kilometers long and transects Miocene to late Quaternary deposit. The east and west strands of the fault zone may have different level of activity based on the variable clarity of mapped morphological expressions.

In this work, new fault strands were identified using aerial photos on eastern side of LTV. These eastern faults has a trend that almost parallel those active traces previously mapped by Besana-Ostman et al., 2012 on the western side of the valley. The newly-mapped faults has left-lateral strike-slip movements and can be separated into two segments based on the kinematic indicators like offsets on river, ridges, and valley together with fluvial terraces displacements. Until this study, no Holocene fault scarps have been identified on the eastern portion of the LTV.

Quaternary activity of faults can be assessed by the evaluation of morphometric indexes. In case of LTVFZ, the most characteristic landforms are fault-generated mountain fronts and valleys where the mountain front sinuosity index Smf is measured for fault activity evaluation. Through this morphometric index, mountain fronts are classified into Class I (Smf 1-1.4); active, Class II (Smf 1.4-2.5); intermediate, and Class III (Smf >2.5); inactive. In this paper, the Smf is calculated for the western and eastern sides of LTV as 1.3 and 1.8, respectively. These Smf values indicate that the western mountain front of the LTV corresponds to Class I while the eastern mountain front is Class II. However, considering the possible two segments of the eastern fault, the index of the northern segment produced 1.35 that indicates an active mountain front (Smf class I).

This study, although preliminary, established additional active traces for the LTVFZ with the potential to generate M6 or greater earthquakes. This is very important because the LTV is the most populated and developed region of SW Iberia with the highest level of seismic hazard.