

Geological aspects of paleoseismicity and archeoseismology in the Rimac Valley, Lima-Perú

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The information about the natural disasters, among these the earthquakes in this part of the margin of the central coast of Peru, were known thanks to the first records of chronicles described by the Spaniards, from the stage of the conquest in the middle of the 15th century.

The Peruvian coast is an active margin, therefore is affected by high seismicity; reason for which in this work we show by sedimentological studies that allowed to identify sedimentary structures generated by seismic effects in unconsolidated sediments of the upper Miocene to the Quaternary of the Lima region, where there is abundant evidence of seismic activity in unconsolidated deposits; especially in fine facies, which have been observed and analyzed in outcrops such as: Pliocene? - Quaternary in the northern of Lima city (Pasamayo), La Herradura, Catalina Huanca, Cerro Cortado, in deposits of Arroyada of Esquina de Asia (Coayllo), Punchauca, San Bartolo.

These past earthquakes also are evidences of seismic activity that affected to the architectonic structures of different archaeological sites in different times, (Complex Maranga, Catalina Huanca, Cajamarquilla, among others).

The coastal area presents a sedimentary filling of unconsolidated material that makes up the different valleys such as the Huaura, Chancay, Chillón, Rímac, Lurín and Mala, which are composed of a thick succession of conglomerates associated with colluvial, aeolian and marsh sediments

(Lecarpentier and Motti 1968, Sebrier and Macharé 1980, Macharé 1981, Palacios et al., 1992, Le-Roux et al 2000, Villacorta et al 2018), which according to the places, take different names such as Cañete Formation, Sarapampa Formation and Conglomerates of Huarmey.

Although the coastal region of central Peru is a region linked to a tectonically active zone, paleoseismological studies are limited, there are some studies on neotectonics (Macharé 1981, Macharé et al., 1986), while studies on paleoseismology they are being recently reported (Jacay et al., 2008, 2012, 2015).

In the unconsolidated deposits present in the great alluvial plains, many are the sedimentary structures of deformation that have been formed during a seismic activity, among these structures the most common observed because of this phenomenon are: contoured pseudonodules layers, load structures, archaeo-seismological, blocks of wall displaced record and material injections: The unconsolidated deposits of the Lima area have a relative abundance of structures linked to seismic events, observed in fine facies that are associated to the different deposits such as torrential fluvial, lacustrine, etc. to date there are no dates to have an idea of the antiquity of the earthquakes that have given rise to these levels of sismites (except Catalina Huanca).

It is important to indicate that many earthquakes have not been registered due to different reasons, such as different types of soil or erosion, because they are mostly high energy fluvial deposits, lateral change of facies of the sedimentary bodies which is common because it is a fluvial deposit in a fluvial-alluvial plain; but we estimate that the sedimentary record shows the most important events and with high intensities.