

Impact of a paleo-earthquake and debris flow in Pikillaqta collapse, Cusco-Perú

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In Cusco Valley, have been highlighted the Tambomachay, Pachatusan and Cusco active faults (Cabrera, 1988 & Benavente et al., 2013). Cusco has a historical and instrumental seismic record $M_w > 5$, events occurred in 1650, 1950 and 1986 (Silgado, 1978, Tavera, 2002). In the same way, during pre-Inca and Inca periods, they suffered the occurrence of earthquakes, this is evidenced in myths and chronicles collected by different chroniclers in XVIth century. These records, however, are limited, due to poor instrumental seismic data.

Thus, during our work on paleosismology and archaeoseismology studies in Cusco with the aim of complementing the seismic catalog, we've visited several archaeological sites. Among the archaeological centers visited, we were more interested in the Pikillaqta Archaeological Park (PAP), a city that was built at Wari Empire time, a culture that developed in southern Peru between 600 and 1000 AD (Bergh, 2012). The interest of studying this site is basically due to its archaeological evidence of unjustified abandonment around 900 AD (McEwan, 2015). Subsequently, our archeoseismology studies, based on the identification of Earthquake Archeological Effects (Rodríguez-Pascua et al., 2011), and post-seismic effects like new architectural elements dated by 14C in 900 AD, allowed us to observe an important seismic event at this age.

In PAP we observed alluvial deposits of up to 2m in height inside the rooms and halls, evidencing a debris flow. Drone images, allowed us to observe drainages related to the entrance of a flow at PAP east, generating an alluvial cone in the PAP main square. Works in situ, allowed us find pottery and bones within the mud flow, dated also around 900 AD.

On the other hand, results of paleosismology in the Tambomachay fault (Rosell, 2018), show a seismic event around 900 AD. With the previously mentioned, exist a clear relationship between archaeoseismology and paleosismological results. The event occurred at the end of the 9th century, originating its attempt at reconstruction and subsequent abandonment.

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