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Archeoseismology in Machu Picchu, Paleoseismology and Lacustrine records in Cuzco region as key interdisciplinary approaches for intraplate deformation characterization on the Andean Altiplano

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Content

In South America, human beings are prone to settle along fault scarps. Emblematic among them in Peru, the touristic and tectonic Cuzco region is affected by damaging earthquakes since the Spaniards arrived, as demonstrated by the 1650, 1950 and 1985 events. This area in the high Altiplano, sitting 400km away from the subduction zone, exhibits a combination of strong seismic hazard and high vulnerability through the presence of active fault segments in densely populated areas. The accurate estimation of past effects of previous earthquakes on build heritage is a key to provide additional data (reccurence, and past impacts) to properly assess the seismic risk in intraplate deformation zones such as the Andean altiplano. Indeed, archeoseismological pioneering studies demonstrated that faulted and disturbed architectural remains can be used as valuable markers to extend the catalog of more classical paleoseismological studies. Prehistoric monumental architecture in Peru goes back to 3000yrs BCE and the construction techniques have been used throughout the country on Machu Picchu and Choquequirao sites among others, proving to be a sustainable resource for the evolution of the south american culture. We plan to map and study the past seismic effects on archeological remains, the construction modes and designs on monumental heritage to complement the evidences of deformation issued from archeological soils, fault trenching and proximal lake coring. Thus we aim to build a catalog prehistoric earthquakes and their induced effects. The overall purpose is to extend the knowledge and time window for the crustal fault activity on the Cuzco-Vilnacota fault system. This work present the first paleo events records from trenching efforts we pursued on the different fault segments and the targeted post glacial lake to core, and monumental building to be studied.

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