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Geological faults were decisive for the construction of Machu Picchu



Incan city was discovered in 1911 and made scientists, over the years, puzzled by its localization

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Professor **Rualdo Menegat** from the Geoscience Institute of the Federal University of Rio Grande do Sul (UFRGS) believes he has unraveled the mystery behind the peculiar localization of Machu Picchu. In September, 2019, during the [Annual Meeting of the Geological Society of America](#), in Phoenix, US, the researcher presented his discovery about how the city would have been built high in the Andes Mountains.

The construction was discovered in 1911 by the American explorer Hiram Bingham, that, in the beginning, believed he had found the mythological “City of the Virgins of the Sun”. Only after the removal of the vegetation and the reassembly of the fallen parts of the constructions, it was possible to conduct investigations that confirmed it to be the lost city of Incas. Over the years, researchers tried to explain the reason for its localization, even reaching to the star’s alignment as a justification, however none of the hypotheses were confirmed. To the extent to what is known, the Incas abandoned the place during the Spanish colonization in the 15th century, so the Spanish never knew of its existence, which remained known only by the local communities.

The study carried out by Menegat hypothesizes that the choice of the city placement was not by chance because only the faults provided the material, hydrographical and geographical conditions for the survival of the residents. The whole Department of Cusco, where Machu Picchu is located, is formed by a great quantity of geological faults that intersect each other and made possible the “fitting” of the cities, as if it were a big Lego. This technique, common among the Incas, was also found in their buildings, which were made of the fitting of blocks in different sizes and shapes. It is believed that this was the determining factor for its preservation even after the occurrence of different natural phenomena in the region, like earthquakes.

These faults would have been caused by the movement of tectonic plates, which have damaged the rocks and eased their progressive degradation. Besides, they have been turned into rain water and snow conductors, enabling the adjustment of agricultural production and the way of life of the pre-Columbian population. To reach this conclusion, it was necessary to make a series of investigations on satellite image screening for Machu Picchu and Ollantaytambo – another Incan site that was analyzed – which resulted in multiple- scale mapping and led to four expeditions – standing out the ones in 2006 and 2010, in which the researcher went to Pisac and surroundings of the city of Cusco, as Tambomachay and Qenqo – to check the discoveries and confirm the existence of faults.

The research began in 1999, when Menegat had started to get interested in the theme, which had also been the subject of his PhD thesis, concluded in 2006. In his new investigation, the researcher aims to find out if the technique of construction that was discovered in the Peruvian part of the Andes Mountains is also found in the Bolivian region.



Research was based on satellite images and expeditions – Image: YouTube/CC BY 2.0

Translated into English by Everton Gehlen Batista, under the supervision and translation revision of Professor Elizamari R. Becker (P.h.D.) - IL/UFRGS

