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HOW INCAS USED GEOLOGICAL FAULTS TO BUILD THEIR SETTLEMENTS

MENEGAT, Rualdo,
Departamento de Paleontologia e Estratigrafia, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves, 9500 - Prédio 43127 - Sala 109, PO Box 15065, Porto Alegre, 91501-970, Brazil

This communication studies the relations between Andean geo-landscape and Inca cities by showing how the town of Machu Picchu, located at Urubamba-Vilcanota valley, has been built. Through techniques of geolandscape archaeology, structural geology and geomorphology, the matrix of the site was established in terms of a very dense geological faults and fractures web. Eight orders of network scales of lineaments and faults have been analyzed, from both satellite images and field data. Both mountains' and rock blocks' geomorphology appear driven by the erosion of mutual intersection of three main faults directions – 020º, 055º, and 330º – and two secondary directions: N-S and E-W. The mutual interference between these faults networks led to typical both fractal geometry of the rock blocks and structural drainage pattern. We show that the Inca developers intentionally chose cross-tectonic faults to build their cities. Indeed, in Machu Picchu, the rocks were so fragmented that it was possible to build cities in high topographic levels, strategically safe against both geological hazards and inhospitable Andean conditions. In addition, the main sectors, buildings, and stairs were built following the three said fault directions. According to this analysis, the Machu Picchu city plan clearly shows the empirical fault and fracture map which underlies its construction.

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